

1070-6.

Alberger HEATERS

EFFICIENT . . . DEPENDABLE . . . ACCESSIBLE

INSTANTANEOUS
HEATERS

FEED WATER
HEATERS

STORAGE
HEATERS

HEAT
EXCHANGERS

VAPOR
CONDENSERS

SURFACE
CONDENSERS

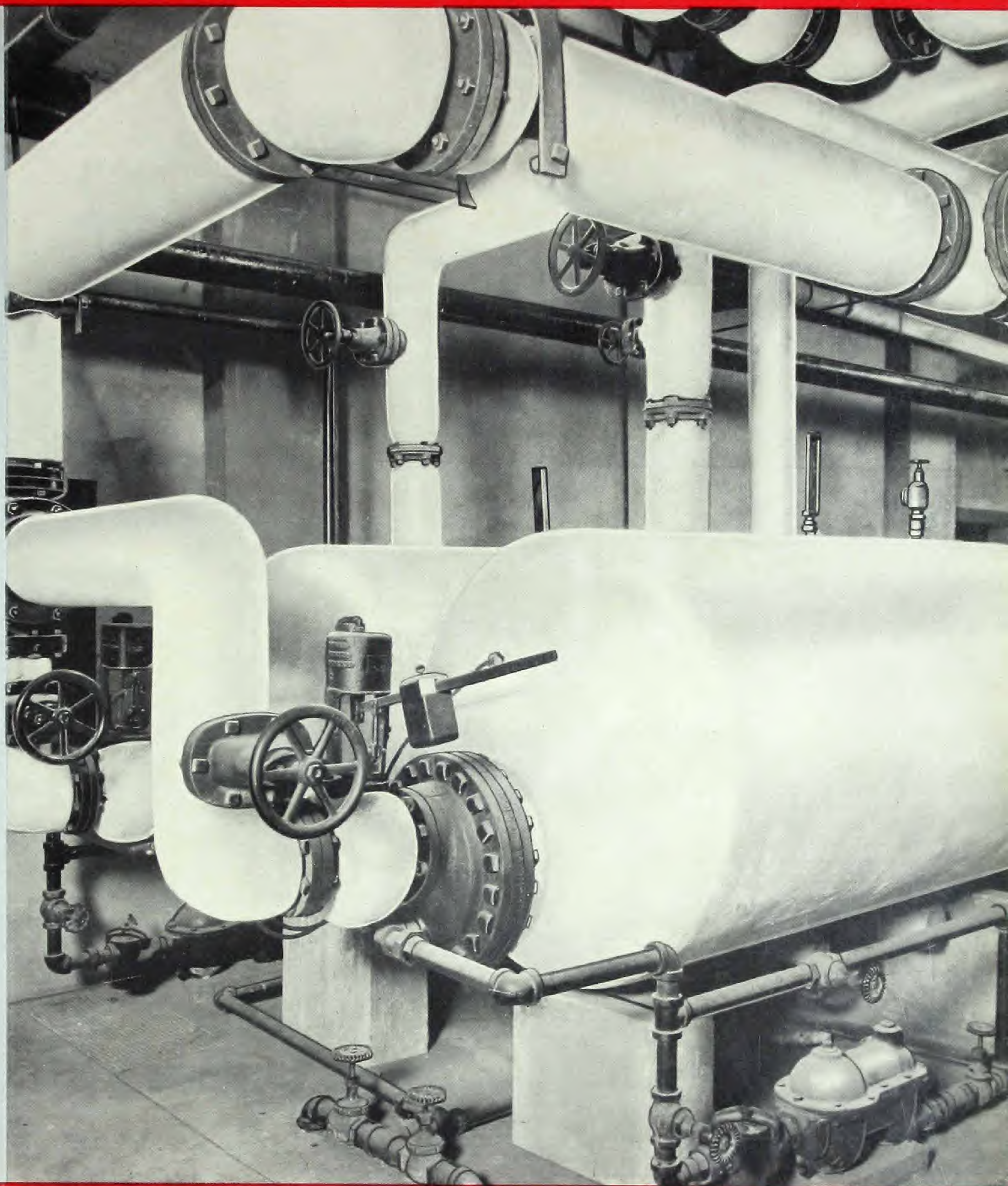
HEATING SYSTEM
CONVERTERS

DOMESTIC WATER
HEATERS

SPECIAL PROCESS
WORK

SWIMMING POOL
HEATERS

COOLERS



ALBERGER BUFFALO

Over 20,000 Alberger HEATER

Welded, Steel Jacketed Vapor Condenser with a copper-silicon alloy inner shell.

A Pioneer in its field, the Alberger Heater Company is widely and favorably known to those engaged in the problems of heat transfer, as applied to commercial, industrial and institutional work.

Over twenty-five years of experience in design and construction, and the successful performance of over twenty thousand installations give the assurance of complete satisfaction embodied in the selection of Alberger Equipment.

The steadfast policy to build only quality apparatus designed to meet the most exacting demands of the operating engineer, coupled with sound, constructive engineering and high quality workmanship have

ALBERGER HEATER COMPANY
BUFFALO, N. Y.

Typical Tube Sheet of a large heating system heater showing lanes for efficient steam distribution.

(Lower)
High Pressure Feed Water Heater with multi-floating heads compensating for unequal expansion caused by extreme temperature differences.

(Above)

Alberger 2600 Sq. Ft. Surface Condenser for a triple effect evaporator. It maintains 26" Hg. vacuum. Outlet temperature of the cooling water is thermostatically controlled at 110° F. A saving of 45,000,000 B.T.U. per hour is effected by using the cooling water from the condenser for process work. An additional saving is made by returning the condensate from the condenser to the boiler.

Correct tube arrangement assures proper vapor distribution. Properly located air off takes from the baffled air cooling compartment assures high efficiency. Admiralty metal tubes, Muntz metal tube sheets and cast iron water boxes impart long life.

INSTALLATIONS

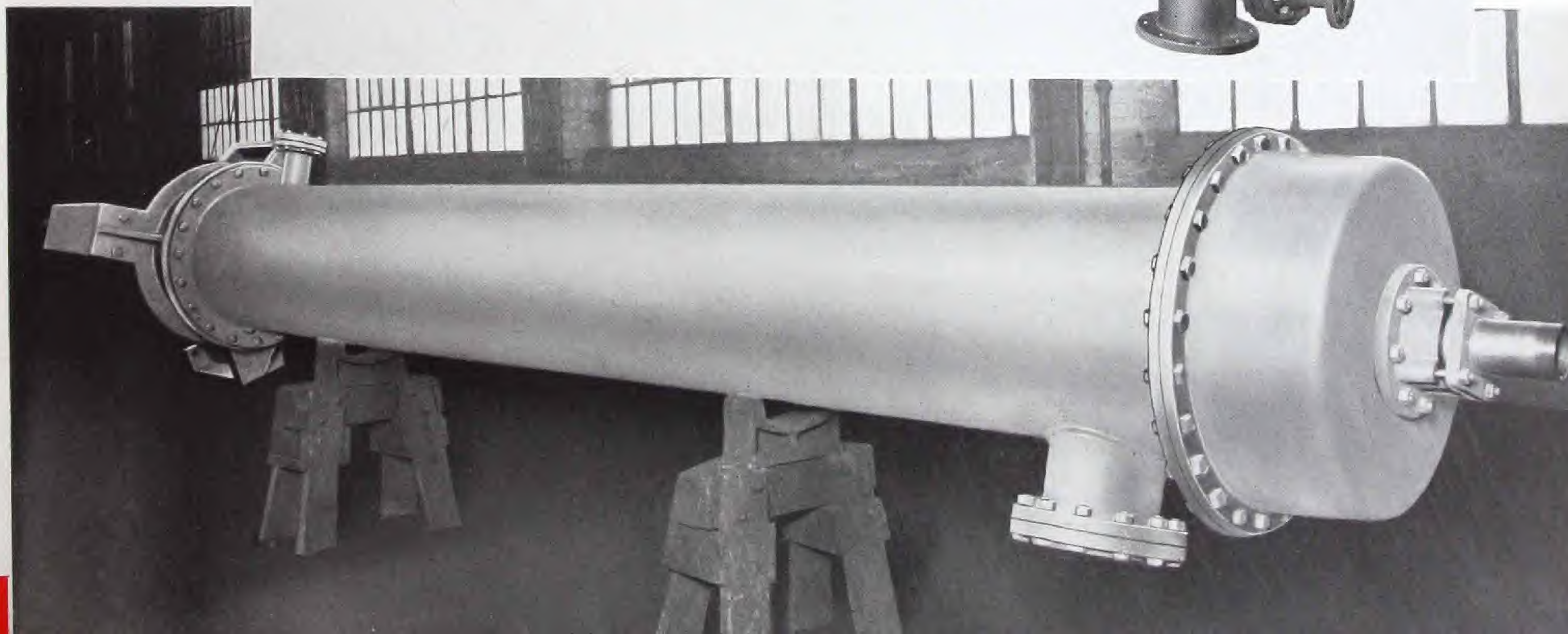
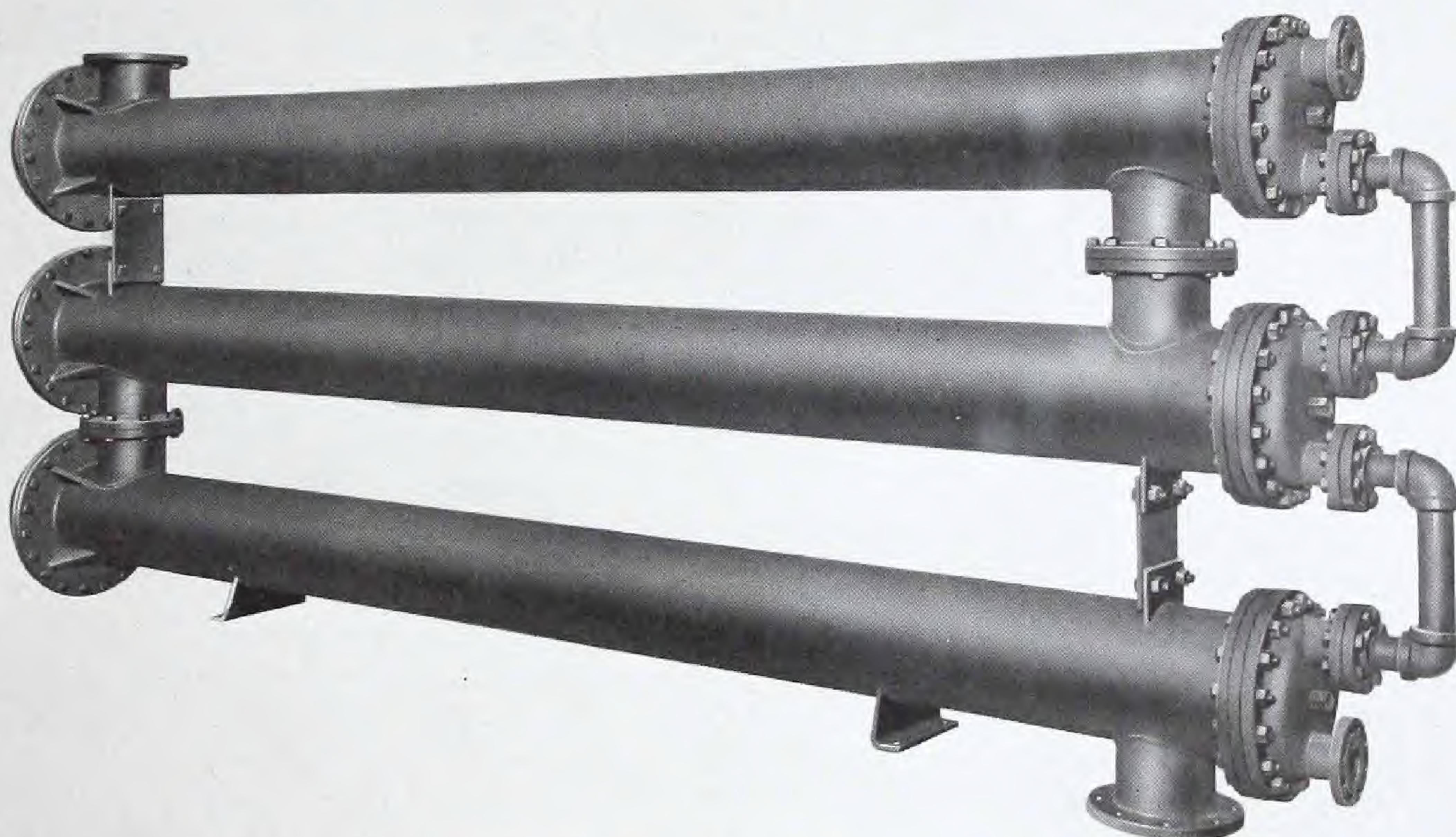
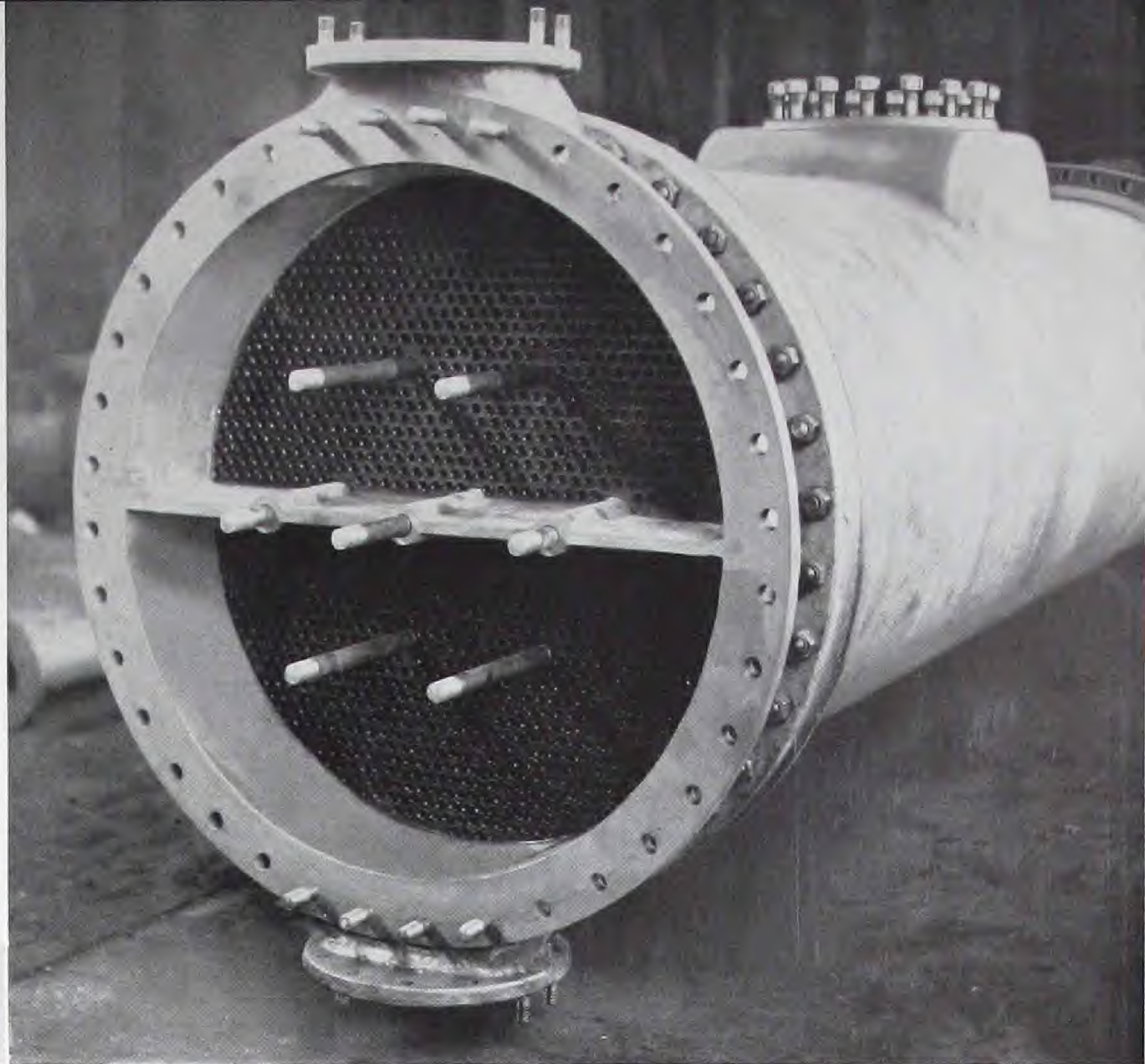
earned for Alberger Equipment the reputation: *Efficient, Dependable, Accessible.*

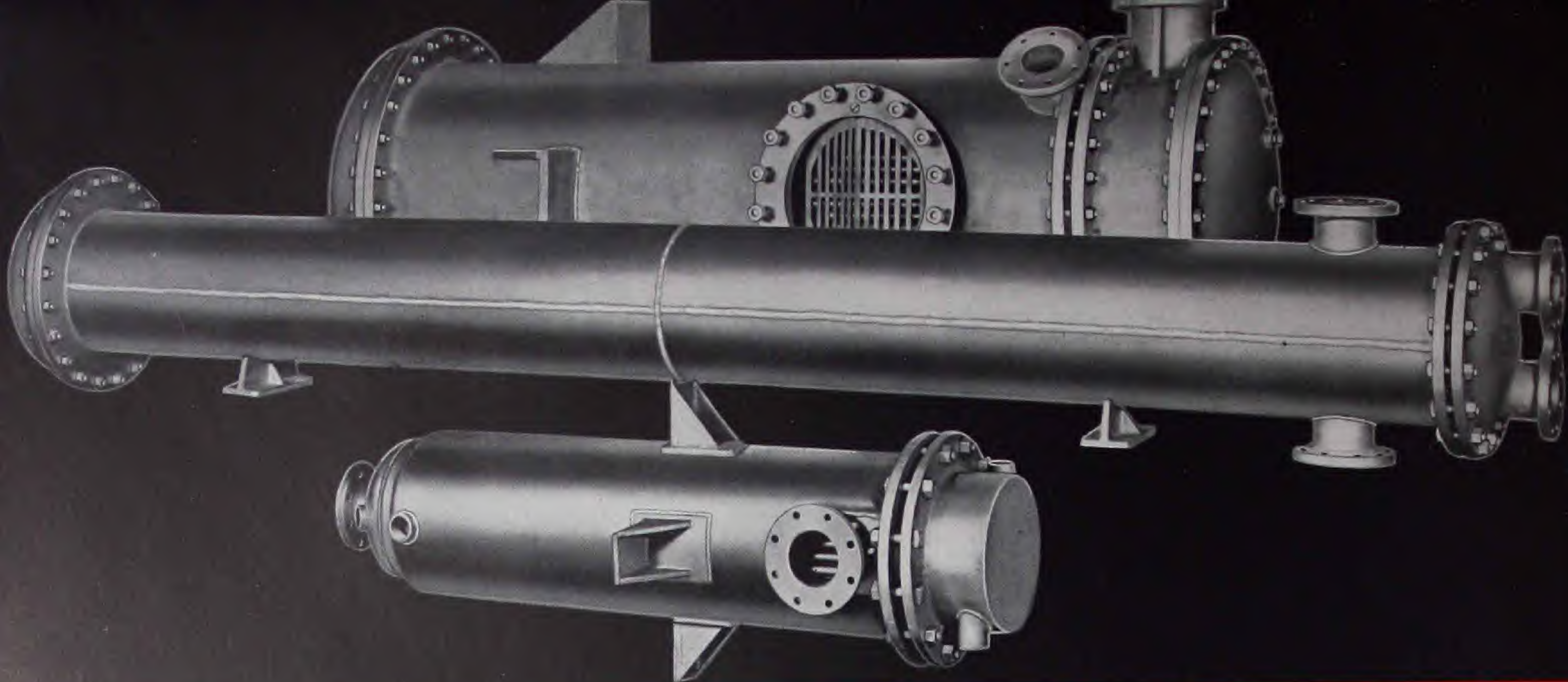
While this Bulletin illustrates many different types of heat exchange equipment, its scope does not permit the display of all the varieties Alberger builds. The following pages outline in detail standard types of Alberger Heaters and furnish useful information for their proper selection. However, as it is impracticable to cover all possible applications, attention is directed to the fact that the Alberger Engineering Department is always available to assist in solving special heat transfer problems.

(Upper Right)
Heat Exchanger
with end cover
removed to show
tube accessibility
and sturdy stay-
bolt construction.

(Right)
Blowdown Ex-
changers install-
ed in a large
power generating
plant for reclaim-
ing heat from
continuous blow-
down.

(Lower)
Gasoline Vapor
Condenser show-
ing single pass
floating head con-
struction with
packed stuffing
box.





Alberger HEAT TRANSFER EQUIPMENT

EFFICIENT . . . DEPENDABLE . . . ACCESSIBLE

ALBERGER Equipment is designed and built to meet the exacting requirements for heaters, coolers, economizers, vapor condensers, and heat exchangers for all industrial and commercial uses. Heaters for water, processing liquids, oils, gases, chemicals, feed water, heating systems and large scale domestic hot water service; condensers for various vapors; and coolers for air, brine, water, oils, chemicals and gases are included.

Satisfactory results . . . Efficient, low-cost operation . . . and Dependable year-in and year-out performance is the typical operating record of more than twenty thousand installations.

In those twenty-five years of all around experience, the Alberger Organization has originated and developed many practical features, advanced designs and improved constructional methods. Some of these features have been universally adopted throughout the industry. To-day, as throughout all those years, Alberger is still contributing new developments and is in the forefront

of advanced practical engineering.

Heating surfaces are scientifically arranged to *increase heat transfer* and compactly assembled to *save space*. Still, Alberger Equipment is exceptionally accessible . . . A *time and money-saving feature* which appeals strongly to maintenance engineers.

Long life with efficient, dependable performance is assured by combining such indispensable factors as *correct design . . . Uncompromising material specifications . . . Sturdy construction . . . and Modern manufacturing methods*.

APPLICATIONS

HEATERS FOR

Air
Alcohol
Chemicals
Domestic Water

Feed Water
Fruit Juice
Molasses
Oil

Process Water
Sprinkler Tanks
Sugar Juice
White Water

.

Coolers
Convertors

Heat Exchangers
Vapor Condensers

Reboilers
Reclaimers

A TYPE and SIZE of HEATER for EVERY PURPOSE

TO efficiently fulfill practically every industrial heater requirement with standard equipment, Alberger Heaters are built in a wide variety of types, materials and sizes. Described in this catalog are four kinds of instantaneous heaters; storage and oil heaters and condensate coolers.

Instantaneous Heaters are usually employed to furnish a constant supply of hot water where the demands are not widely fluctuating; however, they may be used where peak conditions are encountered, provided sufficient steam is available during periods of maximum demand. Standard instantaneous heaters, operated at a relatively high temperature range are built with floating heads or U-bend tubes to compensate for the resultant expansion and contraction.

For this general class of service, Alberger builds three types of Instantaneous Heaters. The Type FC equipped with corrugated tubes and the Type FP with plain tubes are of floating head design; each type can be furnished with either a water channel or bonnet depending upon the degree of tube accessibility desired. In the Type U Instantaneous Heater, the tubes are bent into the form of a U with both ends rolled into the same tube sheet at one end of the heater.

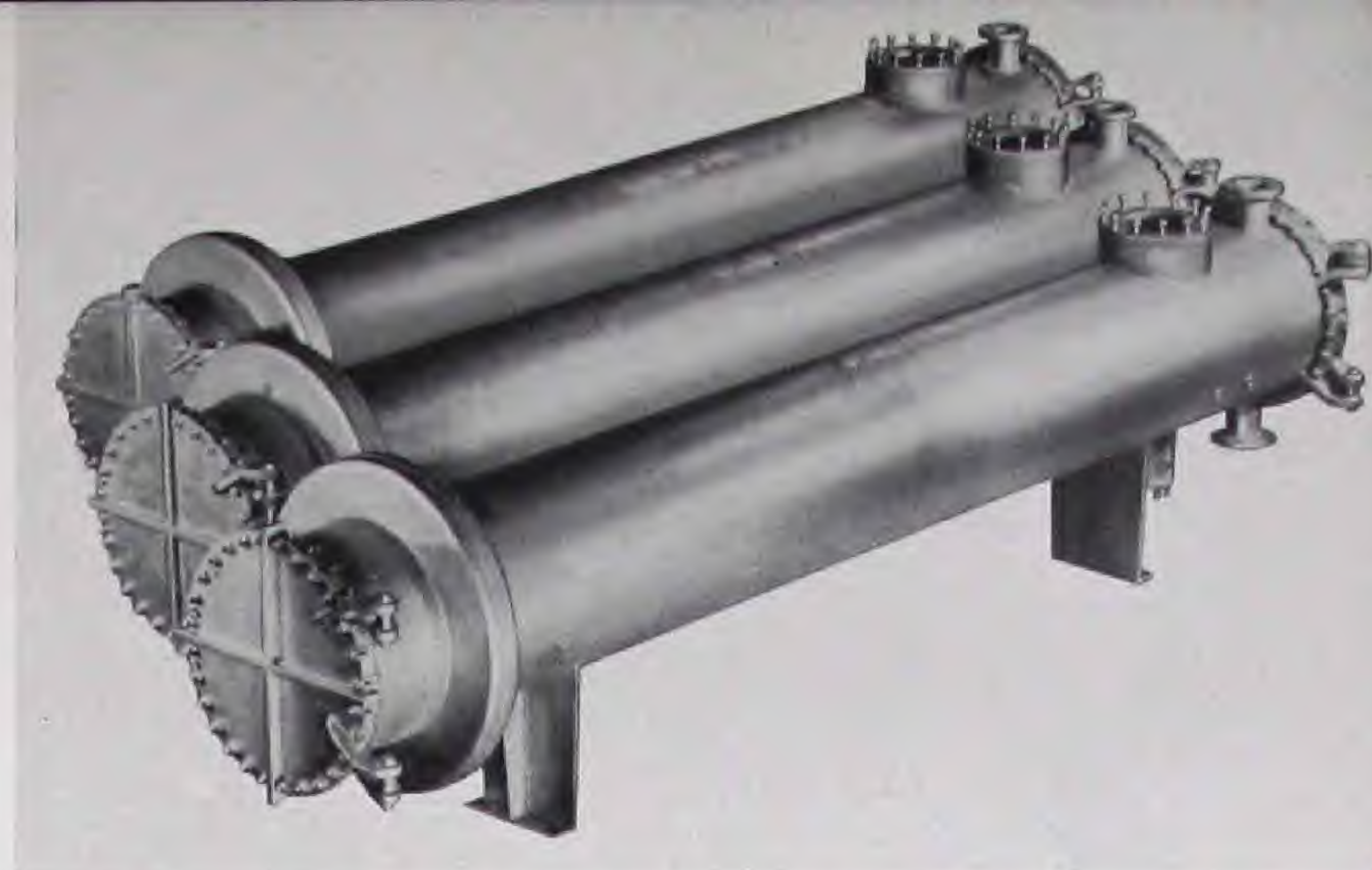
For operating conditions of low temperature ranges, such as prevail in swimming pool and humidifier service, Type AB Instantaneous Heaters are recommended. They are equipped with corrugated tubes rolled into fixed tube sheets. The corrugations in the tubes absorb the slight expansion and contraction.

When an intermittent demand for hot water exists, savings in steam and a more uniform heat consumption can be maintained by using Alberger Type S Storage Heaters. Water is heated constantly. During slack periods the surplus of hot water is stored for use during maximum demands, preventing peak loads on the boiler and avoiding waste of exhaust steam.

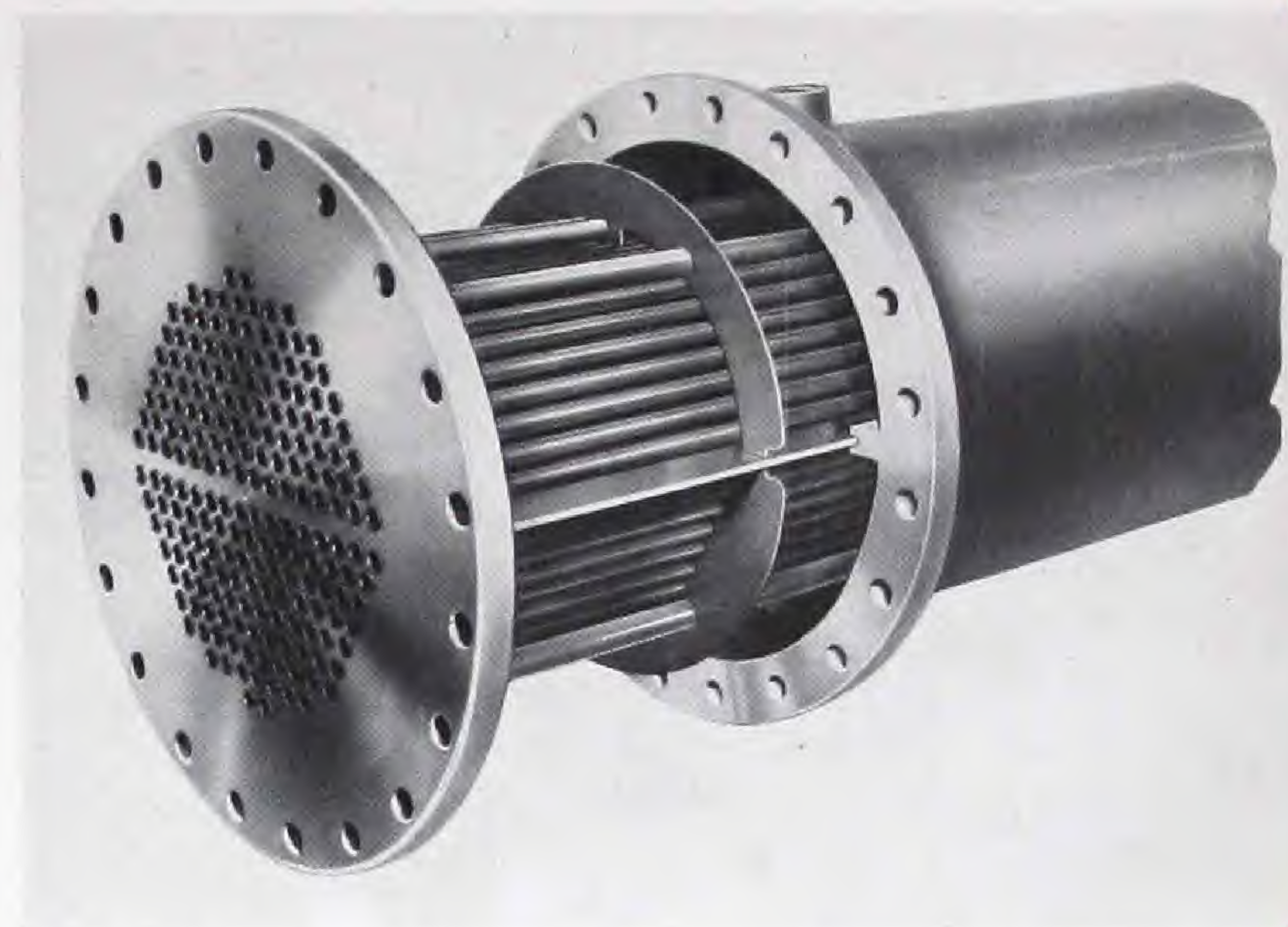
PLACES OF INSTALLATION

Apartment Buildings
Automobile Plants
Breweries
Chemical Plants
Clubs
Dairies
Department Stores
Distilleries
Dormitories
Hospitals
Hotels
Industrial Plants

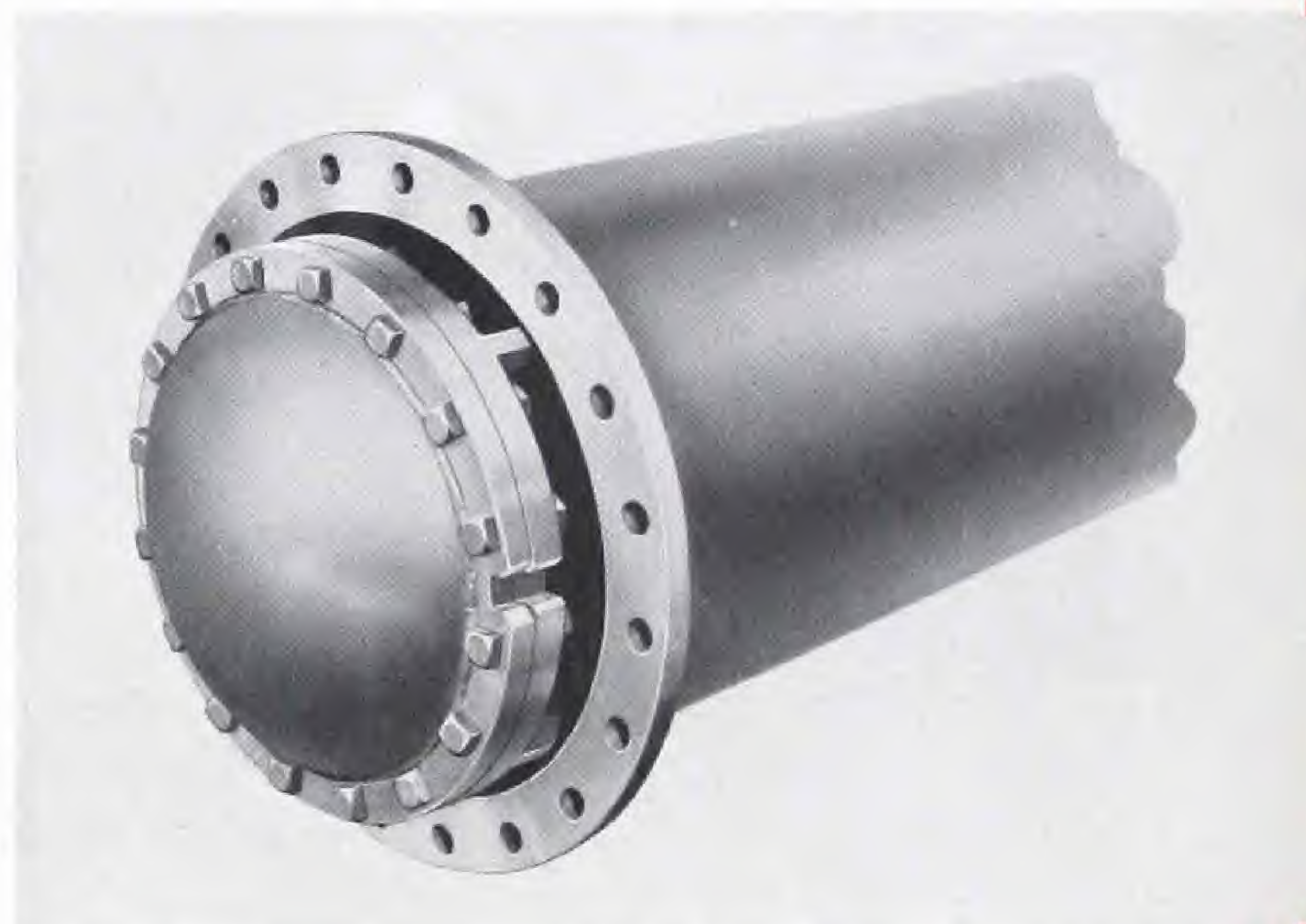
Large Residences
Laundries
Office Buildings
Oil Refineries
Paper Mills
Power Plants
Public Baths
Public Buildings
Schools
Sugar Mills
Steel Mills
Tanneries



Sugar Juice Heaters designed for quick cleaning.

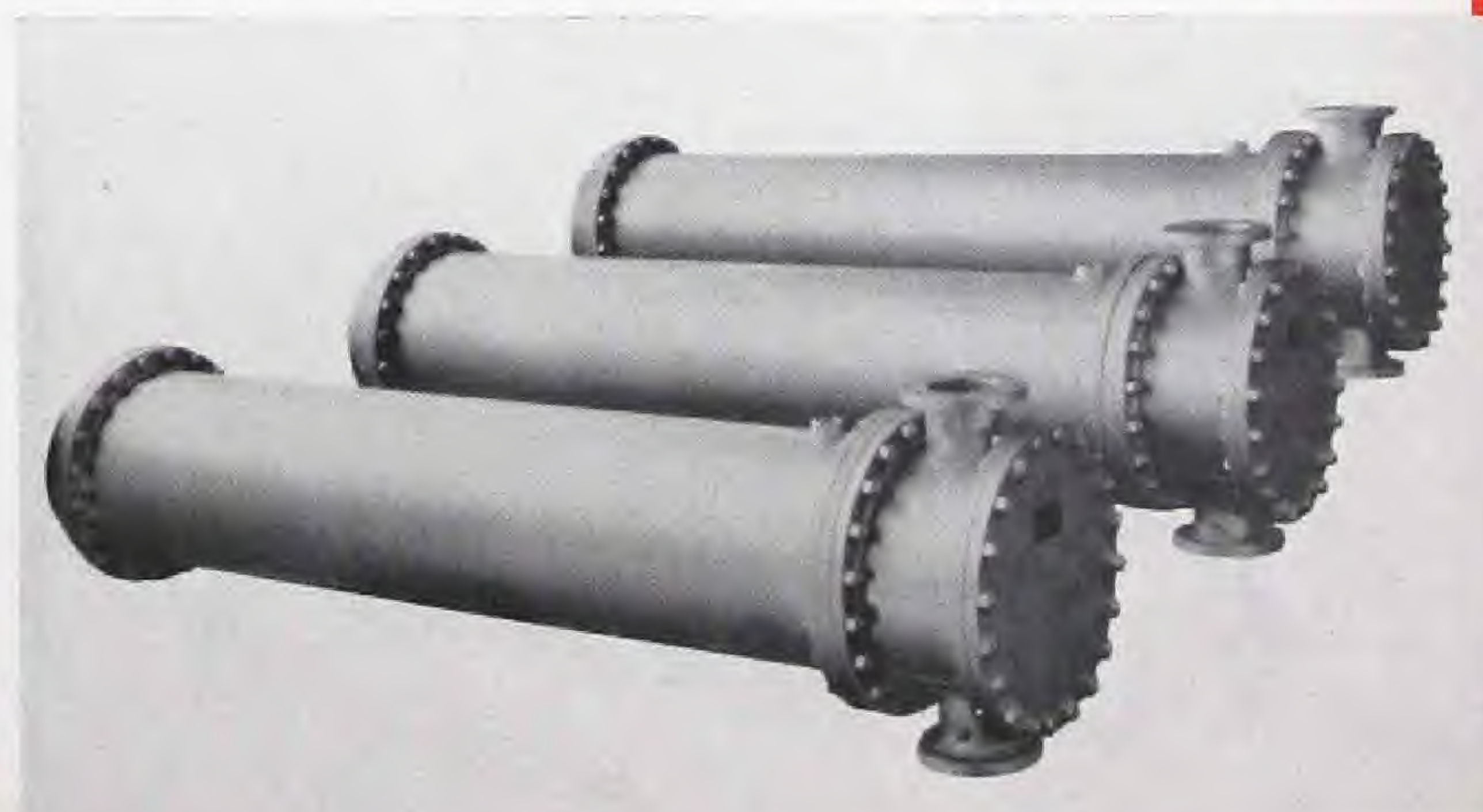


Front view of the removable tube bundle for the heat exchangers in the lower illustration.



Notched floating head and cover of these exchangers.

The completely assembled exchangers are shown below.





Alberger
Instantaneous
Heater, Type FC,
Water Channel
Construction.

Alberger TYPE FC INSTANTANEOUS HEATERS with CORRUGATED TUBES

THE Alberger Standard Type FC Instantaneous Heater has been designed with the object of securing the highest possible degree of heat transmission and to render long, dependable service at a minimum cost of operation. This heater is recommended for the heating of liquids having low viscosities and is particularly suited for operation where the available floor space is limited. It can be furnished for vertical or horizontal installation, performing with equal efficiency in either position.

Many design features incorporated in the Alberger Type FC Heater appeal particularly to the operating engineer especially the high efficiency obtained from the use of Alberger Corrugated Tubes, that allows a heater construction of minimum size with resultant low first cost.

The channel construction permits the opening of the heater for inspection or replacement of tubes without breaking piping connections. The channel is an ideal settling chamber; as, upon entrance of the water into the large areas of the channel, the high velocity through the tubes is suddenly reduced and the direction of flow reversed, suspended matter deposits where it can be blown off through blow off openings provided on the channel cover for this purpose. With the selection of bonnet construction, accessibility to the tubes can still be retained by breaking the water connections and removing the bonnet. The sectional drawing at the bottom of this page furnishes a basis of comparison between the channel and bonnet arrangement.

Floating head construction prevents severe strains due to thermal expansion and contraction. Guide pins secured to the floating tube sheet insure its proper position with reference to the shell diameter and help support the weight of the tubes.

A steam baffle mounted in the steam distributing dome diffuses the entering steam over the heating surface and guards against direct impingement on the tubes.

Where the length of tube necessitates, a tube support plate rigidly anchored at the center of the tube length and directly opposite the steam inlet eliminates vibration of the tubes. The importance of avoiding tube vibration is apparent when it is remembered that vibration will cause crystallization of the tube material with resultant failure of the tube wall.

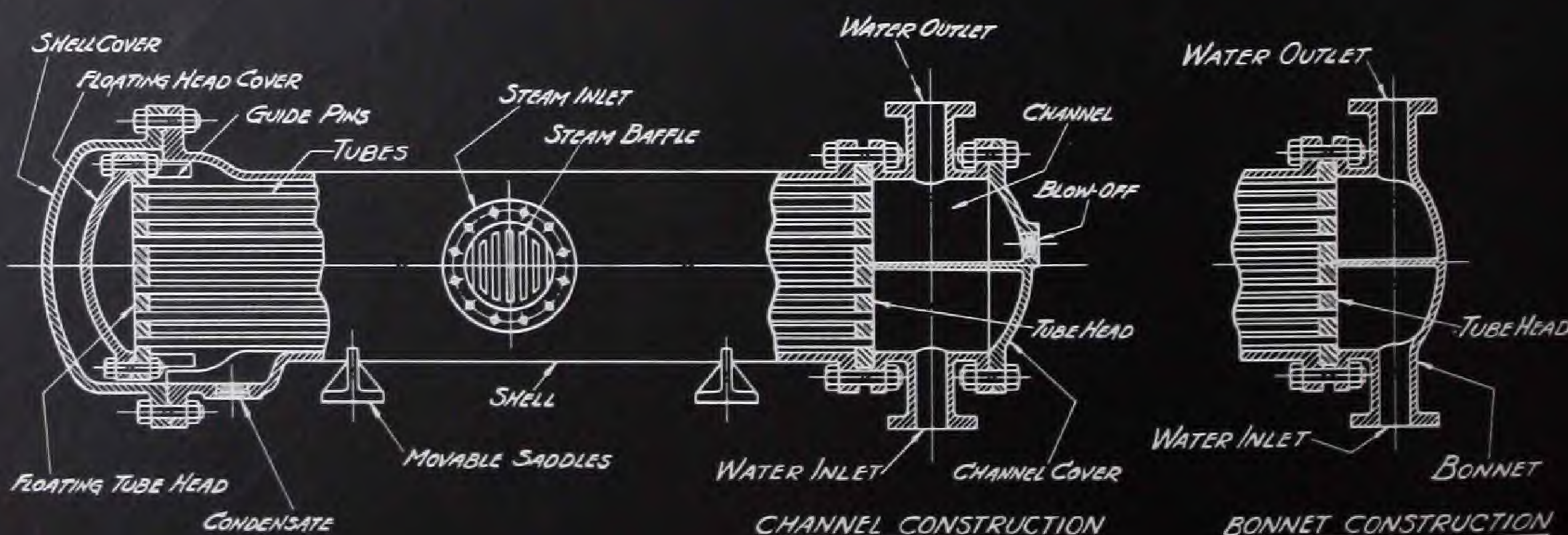
To prolong the life of the packing, all gasket surfaces are accurately machined and recessed; gasket areas and bolt stresses are figured for proper pressure.

Alberger has derived a method and developed special tools to expand tube ends into tube sheets, which assure an absolute and permanent bond.

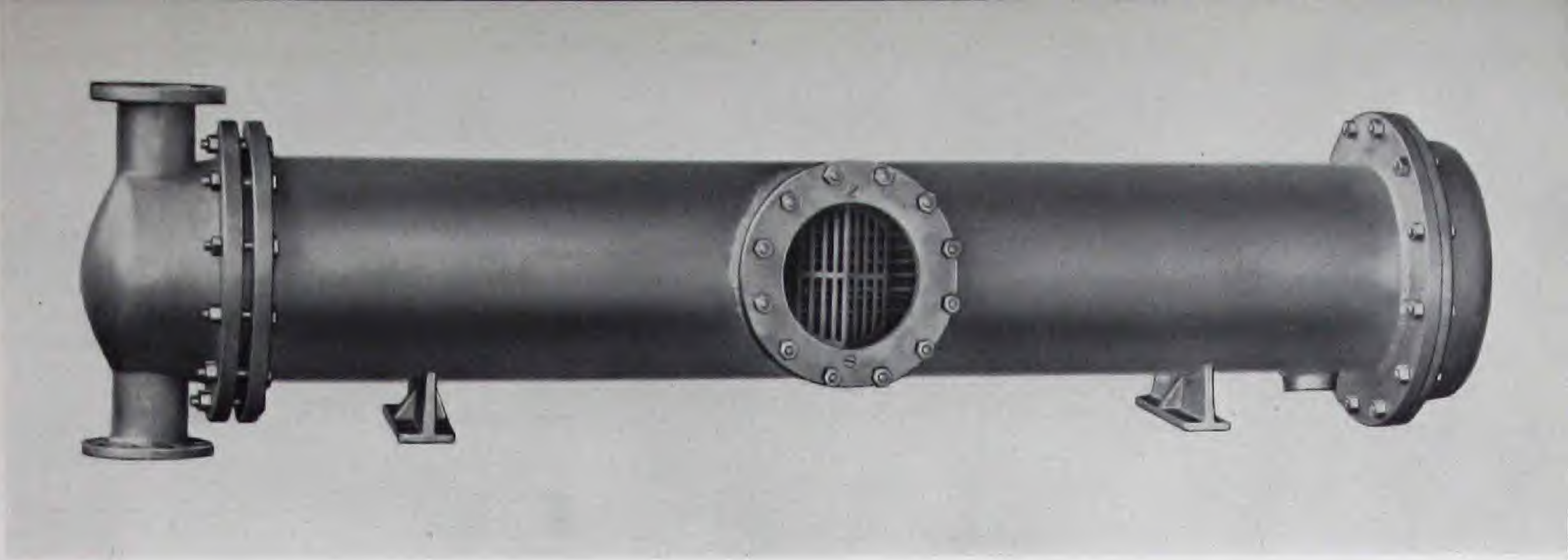
In addition to these unusual features, Alberger Type FC Heaters have the same ruggedness of construction and quality of workmanship and materials that have always distinguished Alberger Equipment.

The following tabulations apply to standard construction, however, Type FC Heaters can be designed to suit special corrosion or pressure conditions.

Sectional Drawing
of an Alberger
Instantaneous
Heater, Type FC.



Alberger
Instantaneous Heater,
Type FC Bon-
net Construction.



SPECIFICATIONS

SPECIFY: A {Horizontal
Vertical} Instantaneous Heater of the closed water tube type. It shall be floating head construction and equipped with $\frac{3}{4}$ " O.D. Corrugated Copper tubes. The heater shall be furnished with water channel to permit inspection or removal of tubes without breaking steam or water piping connections. (If a bonnet is desired instead of the channel specify: The heater shall be furnished with the bonnet arrangement). The heater shall have ample capacity to heat.....GPH of water (or other liquid) from.....°

F. to.....° F., when supplied with sufficient steam at.....Lbs. Gage Pressure.

The pressure loss through the tubes shall not exceedLbs./sq. in. The liquid spaces shall be designed for a working pressure of.....Lbs./sq. in., and the steam spaces for a working pressure of.....Lbs./sq. in. The heater shall be Alberger Type FC or equal. Heater to be as described in the Alberger Heater Company Bulletin No. 200.

STANDARD MATERIALS

Shell.....Cast Iron or Welded Steel
Channel or Bonnet.....Cast Iron
Channel Cover.....Cast Iron
Tube Sheets.....Forged Steel or Bronze

Shell Cover.....Cast Iron
Floating Head Cover.....Cast Iron
Saddles.....Cast Iron
Tubes..... $\frac{3}{4}$ " O.D. Corrugated
seamless drawn Copper

STANDARD PRESSURES

Working Pressure...Shell and tube spaces...125 Lbs./sq. in.
Test Pressure.....Shell and tube spaces...200 Lbs./sq. in.



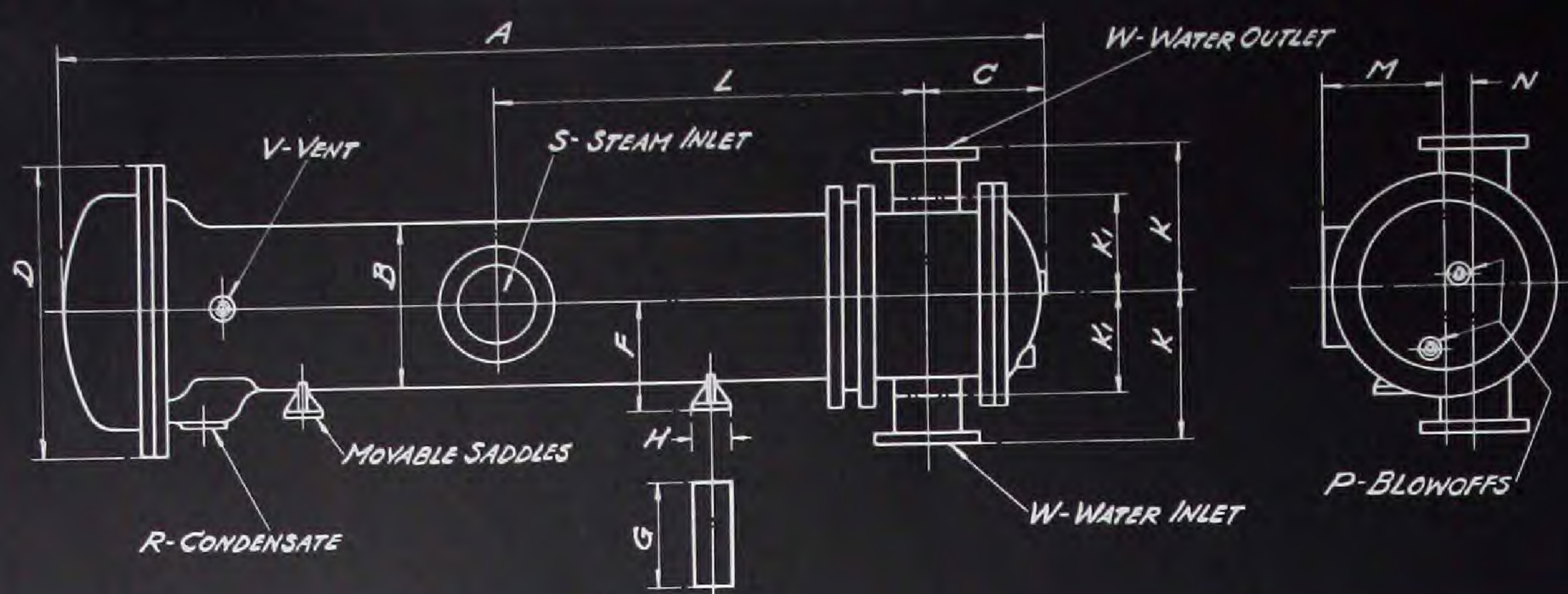
HIGH CAPACITY from *Alberger* CORRUGATED TUBES

FOR heating water, Alberger Spirally corrugated copper tubes are highly and unreservedly recommended for their excellent efficiency. Many tests indicate an increase of as much as 65% in the amount of heat transfer as compared with plain tubes because the spiral corrugations impart a turbulent action to the water as it passes through the tubes, greatly increasing the heat transmission.

Alberger corrugated tubes have a natural tendency to stay clean, thereby maintaining efficient performance over a long operating period. The rotating motion of the

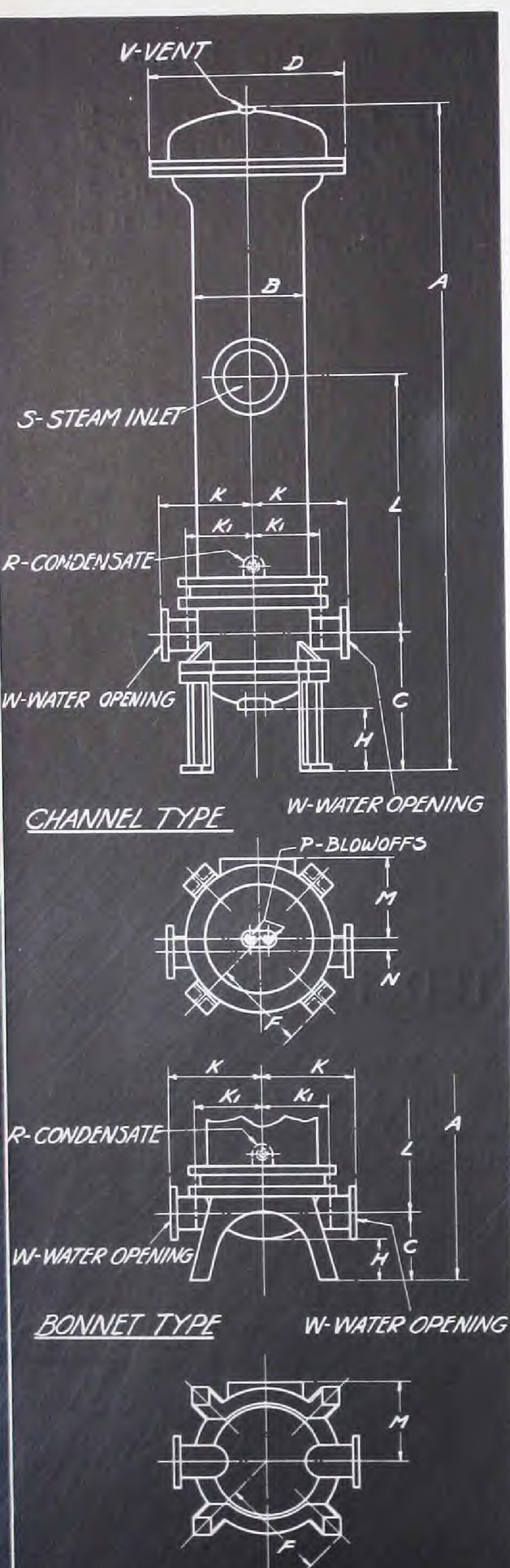
water actuated by the tube corrugations produces a pronounced scouring effect that prevents an accumulation of silt on the tube walls. This tube construction has the added advantage of inducing sufficient flexing in the corrugations due to thermal expansion and contraction to break up hard scale deposits.

These tubes are corrugated with special machinery in our shops by a process developed by ourselves. After corrugation they are subjected to a severe hydrostatic test and rigid inspection.



Alberger Horizontal
Instantaneous
Heater, Type FC —
Water Channel Con-
struction.

Alberger Vertical Instantaneous
Heater, Type FC—Channel and
Bonnet Construction.

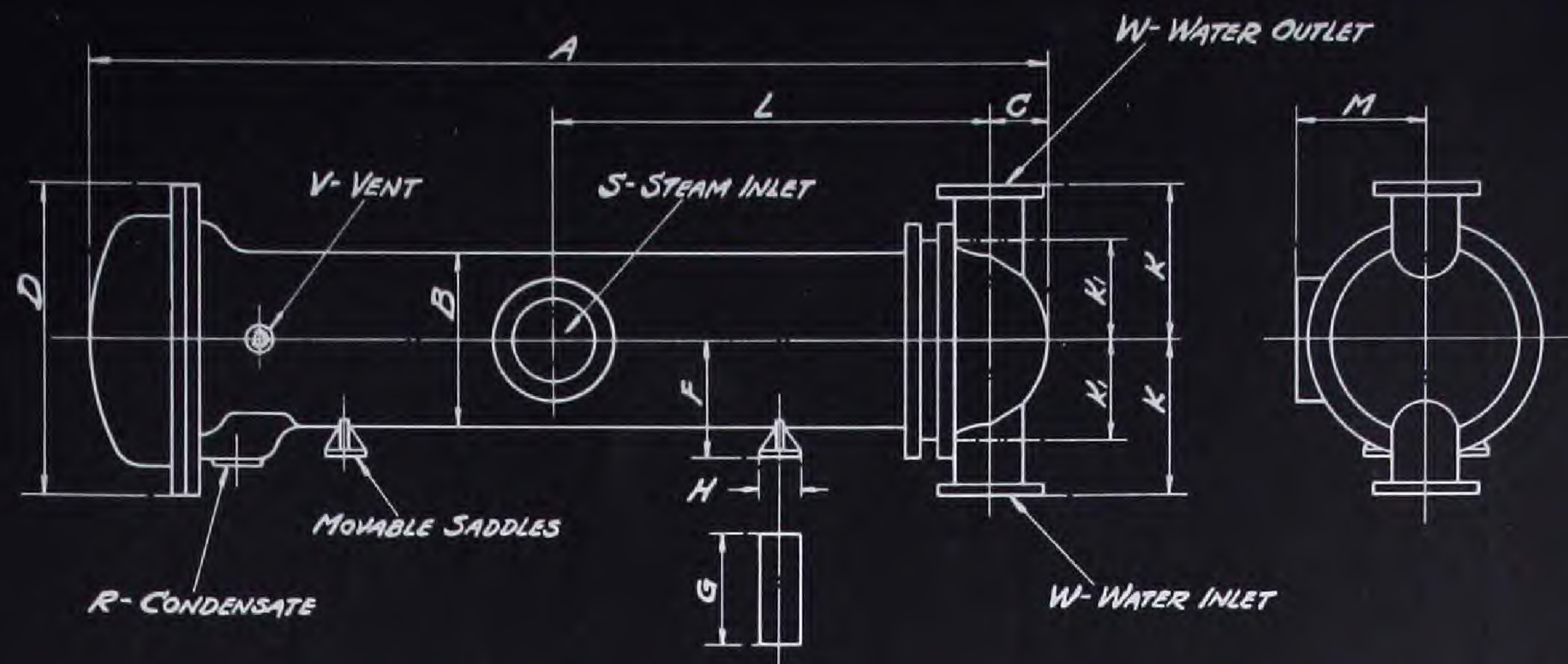


*DIMENSION TABLE—ALBERGER

Heater Size		FC 6A	FC 6B	FC 6C	FC 8A	FC 8B	FC 8C	FC 10A	FC 10B
Horizontal									
SHELL	Cast Iron	B	7 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	9 $\frac{1}{4}$	9 $\frac{1}{4}$	9 $\frac{1}{4}$	11 $\frac{1}{4}$
	Welded Steel	B	6 $\frac{5}{8}$	6 $\frac{5}{8}$	6 $\frac{5}{8}$	8 $\frac{5}{8}$	8 $\frac{5}{8}$	8 $\frac{5}{8}$	10 $\frac{3}{4}$
Flanged Tapped		D	13 $\frac{1}{4}$	13 $\frac{1}{4}$	13 $\frac{1}{4}$	15 $\frac{1}{4}$	15 $\frac{1}{4}$	15 $\frac{1}{4}$	19
		E	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	6 $\frac{1}{2}$	6 $\frac{1}{2}$	6 $\frac{1}{2}$	9
		G	6	6	6	6	6	6	8
		H	3	3	3	3	3	3	3
		K	...	...	...	...	...	...	10
		K₁	4	4	4	5	5	5	8
OPENINGS	Condensate	R	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2
	Steam	S	3	3	3	4	4	4	5
	Vent	V	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3 $\frac{3}{4}$
	Water	W	2	2	2	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3
CHANNEL TYPE		A	61 $\frac{1}{2}$	73 $\frac{1}{2}$	85 $\frac{1}{2}$	62	74	86	66 $\frac{1}{2}$
		C	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	8 $\frac{1}{4}$
		L	13 $\frac{3}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	15 $\frac{1}{2}$
		N	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$
		P	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	1
BONNET TYPE		A	58 $\frac{1}{2}$	70 $\frac{1}{2}$	82 $\frac{1}{2}$	60	72	84	62 $\frac{1}{2}$
		C	2 $\frac{3}{4}$	2 $\frac{3}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$	4 $\frac{1}{2}$
		L	13 $\frac{1}{4}$	13 $\frac{1}{4}$	13 $\frac{1}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	15
Vertical									
SHELL	Cast Iron	B	7 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	9 $\frac{1}{4}$	9 $\frac{1}{4}$	9 $\frac{1}{4}$	11 $\frac{1}{4}$
	Welded Steel	B	6 $\frac{5}{8}$	6 $\frac{5}{8}$	6 $\frac{5}{8}$	8 $\frac{5}{8}$	8 $\frac{5}{8}$	8 $\frac{5}{8}$	10 $\frac{3}{4}$
Flanged Tapped		D	13 $\frac{1}{4}$	13 $\frac{1}{4}$	13 $\frac{1}{4}$	15 $\frac{1}{4}$	15 $\frac{1}{4}$	15 $\frac{1}{4}$	19
		K	4	4	4	5	5	5	8
		K₁	6 $\frac{1}{2}$	6 $\frac{1}{2}$	6 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	8
OPENINGS	Condensate	R	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2
	Steam	S	3	3	3	4	4	4	5
	Vent	V	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3 $\frac{3}{4}$
	Water	W	2	2	2	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3
CHANNEL TYPE		A	68 $\frac{1}{2}$	80 $\frac{1}{2}$	92 $\frac{1}{2}$	71	83	95	75 $\frac{1}{2}$
		C	12 $\frac{3}{4}$	12 $\frac{3}{4}$	12 $\frac{3}{4}$	14 $\frac{3}{4}$	14 $\frac{3}{4}$	14 $\frac{3}{4}$	17 $\frac{1}{4}$
		F	8	8	8	9	9	9	10 $\frac{1}{2}$
		H	7	7	7	9	9	9	9
		L	13 $\frac{3}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	15 $\frac{1}{2}$
		N	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$
		P	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	1
BONNET TYPE		A	62 $\frac{1}{2}$	74 $\frac{1}{2}$	86 $\frac{1}{2}$	64	76	88	68 $\frac{1}{2}$
		C	6 $\frac{3}{4}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$	7 $\frac{1}{4}$	7 $\frac{1}{4}$	7 $\frac{1}{4}$	10 $\frac{1}{4}$
		F	8 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	10	10	10	12
		H	4	4	4	4	4	4	5 $\frac{3}{4}$
		L	13 $\frac{1}{4}$	13 $\frac{1}{4}$	13 $\frac{1}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	15

* All dimensions are in inches.

Alberger Horizontal
Instantaneous
Heater, Type FC —
Bonnet Construc-
tion.



TYPE FC INSTANTANEOUS HEATERS WITH $\frac{3}{4}$ " O.D. CORRUGATED TUBES

FC 10C	FC 10D	FC 12A	FC 12B	FC 12C	FC 12D	FC 14A	FC 14B	FC 14C	FC 14D	FC 16A	FC 16B	FC 16C	FC 16D	FC 19A	FC 19B	FC 19C	FC 19D	FC 21A	FC 21B	FC 21C	FC 21D
11 $\frac{1}{4}$ 10 $\frac{3}{4}$	11 $\frac{1}{4}$ 10 $\frac{3}{4}$	13 $\frac{1}{4}$ 12 $\frac{3}{4}$	13 $\frac{1}{4}$ 12 $\frac{3}{4}$	13 $\frac{1}{4}$ 12 $\frac{3}{4}$	13 $\frac{1}{4}$ 12 $\frac{3}{4}$	15 $\frac{3}{8}$ 15	15 $\frac{3}{8}$ 15	15 $\frac{3}{8}$ 15	15 $\frac{3}{8}$ 15	17 $\frac{1}{2}$ 17	17 $\frac{1}{2}$ 17	17 $\frac{1}{2}$ 17	17 $\frac{1}{2}$ 17	20 $\frac{3}{4}$ 20	20 $\frac{3}{4}$ 20	20 $\frac{3}{4}$ 20	20 $\frac{3}{4}$ 20	22 $\frac{3}{4}$ 22	22 $\frac{3}{4}$ 22	22 $\frac{3}{4}$ 22	22 $\frac{3}{4}$ 22
19 9 8 3 10	19 9 8 3 10	21 $\frac{1}{2}$ 10 10 4 11	21 $\frac{1}{2}$ 10 10 4 11	21 $\frac{1}{2}$ 10 10 4 11	21 $\frac{1}{2}$ 10 10 4 11	23 $\frac{1}{2}$ 11 12 4 12 $\frac{1}{2}$	23 $\frac{1}{2}$ 11 12 4 12 $\frac{1}{2}$	23 $\frac{1}{2}$ 11 12 4 12 $\frac{1}{2}$	23 $\frac{1}{2}$ 11 12 4 12 $\frac{1}{2}$	26 12 12 5 13 $\frac{3}{4}$	26 12 12 5 13 $\frac{3}{4}$	26 12 12 5 13 $\frac{3}{4}$	26 12 12 5 13 $\frac{3}{4}$	29 14 $\frac{1}{2}$ 14 5 15 $\frac{1}{2}$	29 14 $\frac{1}{2}$ 14 5 15 $\frac{1}{2}$	29 14 $\frac{1}{2}$ 14 5 15 $\frac{1}{2}$	29 14 $\frac{1}{2}$ 14 5 15 $\frac{1}{2}$	32 $\frac{1}{2}$ 15 $\frac{3}{4}$ 14 5 17	32 $\frac{1}{2}$ 15 $\frac{3}{4}$ 14 5 17	32 $\frac{1}{2}$ 15 $\frac{3}{4}$ 14 5 17	32 $\frac{1}{2}$ 15 $\frac{3}{4}$ 14 5 17
8	8	9	9	9	9	10 $\frac{1}{2}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$	12	12	12	12	13 $\frac{1}{2}$	13 $\frac{1}{2}$	13 $\frac{1}{2}$	13 $\frac{1}{2}$	14 $\frac{1}{2}$	14 $\frac{1}{2}$	14 $\frac{1}{2}$	14 $\frac{1}{2}$
2 5 $\frac{3}{4}$ 3	2 5 $\frac{3}{4}$ 3	2 $\frac{1}{2}$ 6 $\frac{3}{4}$ 4	2 $\frac{1}{2}$ 6 $\frac{3}{4}$ 4	2 $\frac{1}{2}$ 6 $\frac{3}{4}$ 4	2 $\frac{1}{2}$ 6 $\frac{3}{4}$ 4	3 8 $\frac{3}{4}$ 4	3 8 $\frac{3}{4}$ 4	3 8 $\frac{3}{4}$ 4	3 8 $\frac{3}{4}$ 4	3 10 $\frac{3}{4}$ 6	3 10 $\frac{3}{4}$ 6	3 10 $\frac{3}{4}$ 6	3 10 $\frac{3}{4}$ 6	4 12 1 6	4 12 1 6	4 12 1 6	4 12 1 6	4 12 1 8	4 12 1 8	4 12 1 8	4 12 1 8
90 $\frac{1}{2}$ 8 $\frac{1}{4}$ 40 1 $\frac{3}{4}$ 1	102 $\frac{1}{2}$ 8 $\frac{1}{4}$ 46 1 $\frac{3}{4}$ 1	66 $\frac{1}{2}$ 8 $\frac{1}{4}$ 19 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1	78 $\frac{1}{2}$ 8 $\frac{1}{4}$ 19 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1	90 $\frac{1}{2}$ 8 $\frac{1}{4}$ 39 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1	102 $\frac{1}{2}$ 8 $\frac{1}{4}$ 45 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1	66 $\frac{1}{2}$ 8 $\frac{1}{4}$ 19 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1 $\frac{1}{4}$	78 $\frac{1}{2}$ 8 $\frac{1}{4}$ 19 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1 $\frac{1}{4}$	90 $\frac{1}{2}$ 8 $\frac{1}{4}$ 39 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1 $\frac{1}{4}$	102 $\frac{1}{2}$ 8 $\frac{1}{4}$ 45 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1 $\frac{1}{4}$	67 $\frac{1}{2}$ 8 $\frac{3}{8}$ 22 3 $\frac{3}{8}$ 1 $\frac{1}{4}$	79 $\frac{1}{2}$ 8 $\frac{3}{8}$ 22 3 $\frac{3}{8}$ 1 $\frac{1}{4}$	91 $\frac{1}{2}$ 8 $\frac{3}{8}$ 39 3 $\frac{3}{8}$ 1 $\frac{1}{2}$	103 $\frac{1}{2}$ 8 $\frac{3}{8}$ 45 3 $\frac{3}{8}$ 1 $\frac{1}{4}$	71 $\frac{1}{2}$ 11 22 $\frac{1}{2}$ 3 $\frac{3}{8}$ 1 $\frac{1}{4}$	83 $\frac{1}{2}$ 11 22 $\frac{1}{2}$ 3 $\frac{3}{8}$ 1 $\frac{1}{4}$	95 $\frac{1}{2}$ 11 38 $\frac{1}{2}$ 3 $\frac{3}{8}$ 1 $\frac{1}{4}$	107 $\frac{1}{2}$ 11 44 $\frac{1}{2}$ 3 $\frac{3}{8}$ 1 $\frac{1}{4}$	71 $\frac{1}{2}$ 10 $\frac{1}{4}$ 23 4 $\frac{1}{2}$ 1 $\frac{1}{2}$	83 $\frac{1}{2}$ 10 $\frac{1}{4}$ 23 4 $\frac{1}{2}$ 1 $\frac{1}{2}$	95 $\frac{1}{2}$ 10 $\frac{1}{4}$ 37 $\frac{1}{2}$ 4 $\frac{1}{2}$ 1 $\frac{1}{2}$	107 $\frac{1}{2}$ 10 $\frac{1}{4}$ 43 $\frac{1}{2}$ 4 $\frac{1}{2}$ 1 $\frac{1}{2}$
86 $\frac{1}{2}$ 4 $\frac{1}{2}$ 39 $\frac{1}{2}$	98 $\frac{1}{2}$ 4 $\frac{1}{2}$ 45 $\frac{1}{2}$	64 5 20 $\frac{1}{2}$	76 5 20 $\frac{1}{2}$	88 5 40 $\frac{1}{2}$	100 5 46 $\frac{1}{2}$	64 5 20 $\frac{1}{2}$	76 5 20 $\frac{1}{2}$	88 5 40 $\frac{1}{2}$	100 5 46 $\frac{1}{2}$	66 $\frac{1}{2}$ 5 $\frac{1}{2}$ 23 $\frac{1}{2}$	78 $\frac{1}{2}$ 5 $\frac{1}{2}$ 23 $\frac{1}{2}$	90 $\frac{1}{2}$ 5 $\frac{1}{2}$ 40 $\frac{1}{2}$	102 $\frac{1}{2}$ 5 $\frac{1}{2}$ 46 $\frac{1}{2}$	68 5 $\frac{1}{2}$ 23 $\frac{1}{2}$	80 5 $\frac{1}{2}$ 23 $\frac{1}{2}$	92 5 $\frac{1}{2}$ 39 $\frac{1}{2}$	104 5 $\frac{1}{2}$ 45 $\frac{1}{2}$	70 6 $\frac{3}{4}$ 25	82 6 $\frac{3}{4}$ 25	94 6 $\frac{3}{4}$ 39 $\frac{1}{2}$	106 6 $\frac{3}{4}$ 45 $\frac{1}{2}$
11 $\frac{1}{4}$ 10 $\frac{3}{4}$	11 $\frac{1}{4}$ 10 $\frac{3}{4}$	13 $\frac{1}{4}$ 12 $\frac{3}{4}$	13 $\frac{1}{4}$ 12 $\frac{3}{4}$	13 $\frac{1}{4}$ 12 $\frac{3}{4}$	13 $\frac{1}{4}$ 12 $\frac{3}{4}$	15 $\frac{3}{8}$ 15	15 $\frac{3}{8}$ 15	15 $\frac{3}{8}$ 15	15 $\frac{3}{8}$ 15	17 $\frac{1}{2}$ 17	17 $\frac{1}{2}$ 17	17 $\frac{1}{2}$ 17	17 $\frac{1}{2}$ 17	20 $\frac{3}{4}$ 20	20 $\frac{3}{4}$ 20	20 $\frac{3}{4}$ 20	20 $\frac{3}{4}$ 20	22 $\frac{3}{4}$ 22	22 $\frac{3}{4}$ 22	22 $\frac{3}{4}$ 22	22 $\frac{3}{4}$ 22
19 10 8	19 10 8	21 $\frac{1}{2}$ 11 9	21 $\frac{1}{2}$ 11 9	21 $\frac{1}{2}$ 11 9	21 $\frac{1}{2}$ 11 9	23 $\frac{1}{2}$ 12 10 $\frac{1}{2}$	23 $\frac{1}{2}$ 12 10 $\frac{1}{2}$	23 $\frac{1}{2}$ 12 10 $\frac{1}{2}$	23 $\frac{1}{2}$ 12 10 $\frac{1}{2}$	26 13 $\frac{3}{4}$ 12	26 13 $\frac{3}{4}$ 12	26 13 $\frac{3}{4}$ 12	26 13 $\frac{3}{4}$ 12	29 15 $\frac{1}{2}$ 13 $\frac{1}{2}$	29 15 $\frac{1}{2}$ 13 $\frac{1}{2}$	29 15 $\frac{1}{2}$ 13 $\frac{1}{2}$	29 15 $\frac{1}{2}$ 13 $\frac{1}{2}$	32 $\frac{1}{2}$ 17 14 $\frac{1}{2}$	32 $\frac{1}{2}$ 17 14 $\frac{1}{2}$	32 $\frac{1}{2}$ 17 14 $\frac{1}{2}$	32 $\frac{1}{2}$ 17 14 $\frac{1}{2}$
8	8	9	9	9	9	10 $\frac{1}{2}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$	12	12	12	12	13 $\frac{1}{2}$	13 $\frac{1}{2}$	13 $\frac{1}{2}$	13 $\frac{1}{2}$	14 $\frac{1}{2}$	14 $\frac{1}{2}$	14 $\frac{1}{2}$	14 $\frac{1}{2}$
2 5 $\frac{3}{4}$ 3	2 5 $\frac{3}{4}$ 3	2 $\frac{1}{2}$ 6 $\frac{3}{4}$ 4	2 $\frac{1}{2}$ 6 $\frac{3}{4}$ 4	2 $\frac{1}{2}$ 6 $\frac{3}{4}$ 4	2 $\frac{1}{2}$ 6 $\frac{3}{4}$ 4	3 8 1 4	3 8 1 4	3 8 1 4	3 8 1 4	3 10 1 6	3 10 1 6	3 10 1 6	3 10 1 6	4 12 1 6	4 12 1 6	4 12 1 6	4 12 1 6	4 12 1 8	4 12 1 8	4 12 1 8	4 12 1 8
99 $\frac{1}{2}$ 17 $\frac{1}{4}$ 10 $\frac{1}{2}$ 9 40 1 $\frac{3}{4}$ 1	111 $\frac{1}{2}$ 17 $\frac{1}{4}$ 10 $\frac{1}{2}$ 9 46 1 $\frac{3}{4}$ 1	75 $\frac{1}{2}$ 17 $\frac{1}{4}$ 12 9 19 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1	87 $\frac{1}{2}$ 17 $\frac{1}{4}$ 12 9 19 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1	99 $\frac{1}{2}$ 17 $\frac{1}{4}$ 12 9 39 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1	111 $\frac{1}{2}$ 17 $\frac{1}{4}$ 12 9 45 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1	75 $\frac{1}{2}$ 17 $\frac{1}{4}$ 13 $\frac{1}{2}$ 9 19 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1 $\frac{1}{4}$	87 $\frac{1}{2}$ 17 $\frac{1}{4}$ 13 $\frac{1}{2}$ 9 19 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1 $\frac{1}{4}$	99 $\frac{1}{2}$ 17 $\frac{1}{4}$ 13 $\frac{1}{2}$ 9 39 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1 $\frac{1}{4}$	111 $\frac{1}{2}$ 17 $\frac{1}{4}$ 13 $\frac{1}{2}$ 9 45 $\frac{3}{4}$ 2 $\frac{3}{8}$ 1 $\frac{1}{4}$	76 $\frac{1}{2}$ 17 $\frac{1}{2}$ 15 9 22 3 $\frac{3}{8}$ 1 $\frac{1}{4}$	88 $\frac{1}{2}$ 17 $\frac{1}{2}$ 15 9 22 3 $\frac{3}{8}$ 1 $\frac{1}{4}$	100 $\frac{1}{2}$ 17 $\frac{1}{2}$ 15 9 39 3 $\frac{3}{8}$ 1 $\frac{1}{2}$	112 $\frac{1}{2}$ 17 $\frac{1}{2}$ 15 9 45 3 $\frac{3}{8}$ 1 $\frac{1}{4}$	80 $\frac{1}{2}$ 20 16 $\frac{1}{2}$ 9 22 $\frac{1}{2}$ 3 $\frac{3}{8}$ 1 $\frac{1}{4}$	92 $\frac{1}{2}$ 20 16 $\frac{1}{2}$ 9 22 $\frac{1}{2}$ 3 $\frac{3}{8}$ 1 $\frac{1}{4}$	104 $\frac{1}{2}$ 20 16 $\frac{1}{2}$ 9 38 $\frac{1}{2}$ 3 $\frac{3}{8}$ 1 $\frac{1}{4}$	116 $\frac{1}{2}$ 20 16 $\frac{1}{2}$ 9 44 $\frac{1}{2}$ 3 $\frac{3}{8}$ 1 $\frac{1}{4}$	80 $\frac{1}{2}$ 19 $\frac{1}{4}$ 17 $\frac{1}{2}$ 9 23 4 $\frac{1}{2}$ 1 $\frac{1}{2}$	92 $\frac{1}{2}$ 19 $\frac{1}{4}$ 17 $\frac{1}{2}$ 9 23 4 $\frac{1}{2}$ 1 $\frac{1}{2}$	104 $\frac{1}{2}$ 19 $\frac{1}{4}$ 17 $\frac{1}{2}$ 9 37 $\frac{1}{2}$ 4 $\frac{1}{2}$ 1 $\frac{1}{2}$	116 $\frac{1}{2}$ 19 $\frac{1}{4}$ 17 $\frac{1}{2}$ 9 43 $\frac{1}{2}$ 4 $\frac{1}{2}$ 1 $\frac{1}{2}$
92 $\frac{1}{2}$ 10 $\frac{1}{4}$ 12 5 $\frac{3}{4}$ 39 $\frac{1}{2}$	104 $\frac{1}{2}$ 10 $\frac{1}{4}$ 12 5 $\frac{3}{4}$ 45 $\frac{1}{2}$	70 10 $\frac{3}{4}$ 14 $\frac{1}{4}$ 5 $\frac{3}{4}$ 20 $\frac{1}{2}$	82 10 $\frac{3}{4}$ 14 $\frac{1}{4}$ 5 $\frac{3}{4}$ 20 $\frac{1}{2}$	94 10 $\frac{3}{4}$ 14 $\frac{1}{4}$ 5 $\frac{3}{4}$ 40 $\frac{1}{2}$	106 10 $\frac{3}{4}$ 14 $\frac{1}{4}$ 5 $\frac{3}{4}$ 46 $\frac{1}{2}$	71 $\frac{1}{2}$ 12 15 $\frac{3}{4}$ 7 $\frac{1}{4}$ 20 $\frac{1}{2}$	83 $\frac{1}{2}$ 12 15 $\frac{3}{4}$ 7 $\frac{1}{4}$ 20 $\frac{1}{2}$	95 $\frac{1}{2}$ 12 15 $\frac{3}{4}$ 7 $\frac{1}{4}$ 40 $\frac{1}{2}$	107 $\frac{1}{2}$ 12 15 $\frac{3}{4}$ 7 $\frac{1}{4}$ 46 $\frac{1}{2}$	74 12 $\frac{3}{4}$ 17 $\frac{1}{4}$ 7 $\frac{1}{4}$ 23 $\frac{1}{2}$	86 12 $\frac{3}{4}$ 17 $\frac{1}{4}$ 7 $\frac{1}{4}$ 23 $\frac{1}{2}$	98 12 $\frac{3}{4}$ 17 $\frac{1}{4}$ 7 $\frac{1}{4}$ 40 $\frac{1}{2}$	110 12 $\frac{3}{4}$ 17 $\frac{1}{4}$ 7 $\frac{1}{4}$ 46 $\frac{1}{2}$	75 $\frac{1}{2}$ 12 $\frac{3}{4}$ 19 $\frac{1}{2}$ 7 $\frac{1}{4}$ 23 $\frac{1}{2}$	87 $\frac{1}{2}$ 12 $\frac{3}{4}$ 19 $\frac{1}{2}$ 7 $\frac{1}{4}$ 23 $\frac{1}{2}$	99 $\frac{1}{2}$ 12 $\frac{3}{4}$ 19 $\frac{1}{2}$ 7 $\frac{1}{4}$ 39 $\frac{1}{2}$	111 $\frac{1}{2}$ 12 $\frac{3}{4}$ 19 $\frac{1}{2}$ 7 $\frac{1}{4}$ 45 $\frac{1}{2}$	77 $\frac{1}{2}$ 14 21 7 $\frac{1}{4}$ 25	89 $\frac{1}{2}$ 14 21 7 $\frac{1}{4}$ 25	101 $\frac{1}{2}$ 14 21 7 $\frac{1}{4}$ 39 $\frac{1}{2}$	113 $\frac{1}{2}$ 14 21 7 $\frac{1}{4}$ 39 $\frac{1}{2}$

Flanged openings are faced and drilled 125 lbs. American Standard.

***CAPACITY TABLES—ALBERGER TYPE FC—INSTANTANEOUS HEATERS
FLOATING HEAD TYPE WITH CORRUGATED TUBES**

Capacities in gallons per hour										Maximum friction 8 Lbs./sq. in.								
Inlet Temp. ° F.	Outlet Temp. ° F.	Heater Sizes										FC 10-D	FC 12-B	FC 12-C	FC 12-D	FC 14-B	FC 14-C	FC 14-D
		FC 6A	FC 6B	FC 6C	FC 8A	FC 8B	FC 8C	FC 10-B	FC 10-C									
Steam at 0 Lbs. Gage																		
40	140	1380	1950	2850	3060	4360	6200	6450	9400		10050	15200				21500		
	160	1300		1510	2930		3330	3920	5000	6900		8050	11000		11400	15500		
	180	730	1040		1480	2300		3440		3550	5500		5600	8000				
	200	390	615	625	760	1170	1340	1970	2000	2770	3020	3300	4450		4600	6300		
50	140	1430	2240	2900	3170	4950	6430	7450	9650		11700	15500		17100	21900			
	160	1380		1670	3060		3660	3920	5550	7650		8800	12000		12600	17100		
	180	730	1120		1590	2460		3700		3760	5850		6000	8500				
	200	410	615	635	790	1170	1400	1970	2100	2900	3020	3400	4650		4800	6500		
60	140	1680	2650	2900	3750	5850	6430	8800	9650		13800	15500		20200	21900			
	160	1380		1880	3060		4170	4270	6250	8600		10000	13700		14200	19300		
	180	765	1180		1710	2620		3920		4070	6300		6500	8900		9100		
	200	430	615	665	830	1170	1470	1970	2200	3040		3850	4870		5050	6900		
100	160	1550	2580	2900	3480	5400	6430	8150	9650		12800	15500		18600	21900			
	180	1180		1370	2650		3030	3920	4570	6300		7300	10000		10300	14000		
	200	560	615	860	1070	1300	1900	1970	2840	3080		4600	4950		6500	7000		
HOT WATER CONVERTORS — FORCED CIRCULATION																		
160	190	1270	2000	2900	3060	4400	6400	6600	9650		10400	15500			21900			
Steam at 2 Lbs. Gage																		
40	140	1380	2170	2900	3070	4800	6430	7200	9650		11300	15500		16400	21900			
	160	1270		1710	3060		3780	3920	5700	7800		9100	12500		12900	17600		
	180	780	1180		1750	2620		3920		4150	6300		6620	8900				
	200	530	615	820	1020	1230	1810	1970	2700	3080		4380	4950		6200	7000		
50	140	1600	2500	2900	3550	5550	6430	8350	9650		13100	15500		19000	21900			
	160	1380		1900	3060		4200		6330	8700		10100	13900		14300	19400		
	180	840	1180		1890	2620		3920		4470	6300		7150	8900		10000		
	200	560	615	860	1070	1300	1910		2850	3080		4630	4950		6500	7000		
60	140	1870	2900		4150	6430		9650			15300	15500		21900				
	160	1380	1470	2150	3060	3140	4750	4900	7180	9150		11400	14700		16300	20800		
	180	920	1180		2060	2620		3920		4880	6300		7800	8900		10800		
	200	590	625	910	1140	1380	2010		3010		3260	4900			6900	7000		
100	160	1870	2900		4150	6430		9500			15000	15500		21900				
	180	1380		1690	3060		3720	3920	5600	7700		9000	12300			17200		
	200	730	830	1025	1380	1830	2280	2740	3410		4350	5470		6300	7720			
HOT WATER CONVERTORS — FORCED CIRCULATION																		
160	190	1760	2780	2900	3920	6150	6430	9300	9650		14500	15500		21000	21900			
Steam at 5 Lbs. Gage																		
40	140	1600	2500	2900	3550	5550	6430	8350	9650		13100	15500		19100	21900			
	160	1380		2050	3060	3150	4520	4650	6800	9150		10900	14700		15500	20800		
	180	970	1180		2180	2620		3920		5200	6300		8250	8900		11500		
	200	730	780	1025	1380	1720	2280	2580	3410		4110	5470		5950	7720			
	210	480	615	740	930	1170	1650	1970	2460	3080		4000	4950		5650	7000		
50	140	1870	2900		4150	6430		9650			15300	15500		21900				
	160	1380	1560	2290	3060	3450	5050	5200	7600	9150		12100	14700		17200	20800		
	180	1050	1180	1230	2380	2620	2710	3920		5630	6300	6550	9000		9250	12500		
	200	730	830	1025	1380	1820	2280	2730	3410		4360	5470		6300	7720			
	210	505	615	780	970	1180	1720	1970	2580	3080		4180	4950		5950	7000		
60	140	2200	2900		4910	6430		9650			15500			21900				
	160	1380	1770	2600	3060	3910	5720	5900	8650	9150	9250	13800	14700		19600	20800		
	180	1160		1340	2600		2960	3920		6150	6300	7150	9800		10100	13700		
	200	730	880	1025	1380	1950	2280	2930	3410		4650	5470		6750	7720			
	210	530	615	825	1020	1240	1820	1970	2720	3080		4400	4950		6230	7000		
100	160	2280	2900		5100	6430		9650			15500			21900				
	180	1380	1500	2180	3060	3300	4830	4900	7300	9150		11600	14700		16600	20800		
	200	775	1180		1750	2620		3920		4140	6300		6600	8900		9250		
	210	680	720	1025	1310	1580	2280	2380	3410		3770	5470		5500	7720			
HOT WATER CONVERTORS — FORCED CIRCULATION																		
160	190	2640	2900		5900	6430		9650			15500			21900				

* See footnote, page 11.

***CAPACITY TABLES—ALBERGER TYPE FC—INSTANTANEOUS HEATERS
FLOATING HEAD TYPE WITH CORRUGATED TUBES**

Capacities in gallons per hour								Maximum friction 8 Lbs./sq. in.													
Inlet Temp. ° F.	Outlet Temp. ° F.	FC 6A	FC 6B	FC 6C	FC 8A	FC 8B	FC 8C	Heater Sizes				FC 10-A	FC 10-B	FC 10-C	FC 10-D	FC 12-B	FC 12-C	FC 12-D	FC 14-B	FC 14-C	FC 14-D
Steam at 10 Lbs. Gage																					
40	140	1920	2900	.....	4280	6430	.....	.....	9650	.....	.....	.....	15500	.....	.....	.....	21900	.....	.....	.....
	160	1380	1730	2520	3060	3800	5550	.....	5750	8400	9150	.....	13400	14700	.....	.....	19100	20800	.....	.....
	180	1260	.....	1460	2820	.....	3210	.....	3920	4850	6700	.....	7750	10600	.....	.....	11000	14900	.....	.....
	200	730	1110	.....	1580	2440	.....	.....	3660	.....	3720	5800	.....	.....	.....	8450	.....	.....	.....	.....
	220	500	615	780	970	1175	1710	.....	1970	2560	3080	.....	4160	4950	.....	.....	5900	7000	.....	.....
50	140	2220	2900	.....	5000	6430	.....	.....	9650	.....	.....	.....	15500	.....	.....	.....	21900	.....	.....	.....
	160	1380	1940	2850	3060	4380	6250	.....	6430	9450	.....	10100	15100	.....	.....	.....	21400	.....	.....	.....
	180	1370	.....	1590	3060	.....	3500	.....	3920	5300	7300	.....	8500	11600	.....	.....	12000	16300	.....	.....
	200	740	1180	.....	1670	2600	.....	.....	3900	.....	.....	6150	.....	6340	8900	.....	.....	.....	.....	.....
	220	525	615	820	1020	1230	1800	.....	1970	2700	3080	.....	4360	4950	.....	.....	6200	7000	.....	.....
60	140	2660	2900	.....	5950	6430	.....	.....	9650	.....	.....	.....	15500	.....	.....	.....	21900	.....	.....	.....
	160	1400	2210	2900	3130	4880	6430	.....	7350	9650	.....	11500	15500	.....	.....	.....	16700	21900	.....	.....
	180	1380	.....	1740	3060	.....	3850	.....	3960	5800	8000	.....	9300	12700	.....	.....	13100	17800	.....	.....
	200	800	1180	.....	1800	2620	.....	.....	3920	.....	4270	6300	.....	6810	8900	.....	.....	9550	.....	.....
	220	555	615	855	1060	1280	1890	.....	1970	2820	3080	.....	4580	4950	.....	.....	6500	7000	.....	.....
100	160	2900	.....	.....	6430	.....	.....	.....	.....	.....	.....	.....	15500	.....	.....	.....	21900	.....	.....	.....
	180	1380	2000	2900	3060	4420	6430	.....	9650	.....	.....	10400	15500	.....	.....	.....	21900	.....	.....	.....
	200	1150	1180	1340	2580	2620	.....	.....	3920	4450	6100	6300	7100	9800	.....	.....	10000	13600	.....	.....
	220	700	740	1025	1350	1610	2280	.....	2450	3410	.....	3880	5470	.....	.....	5630	7720	.....	.....	.....
HOT WATER CONVERTORS — FORCED CIRCULATION																					
160	190	2900	.....	.....	6430	.....	.....	.....	9650	.....	.....	.....	15500	.....	.....	.....	21900	.....	.....	.....
Steam at 25 Lbs. Gage																					
40	140	2720	2900	.....	6100	6430	.....	9150	9650	.....	.....	.....	15500	.....	.....	.....	21900	.....	.....	.....
	160	1610	2540	2900	3600	5600	6430	.....	8450	9650	.....	13200	15500	.....	.....	.....	19300	21900	.....	.....
	180	1380	1520	2300	3060	3460	5100	.....	5220	7700	9150	.....	12200	14700	.....	.....	17400	20800	.....	.....
	200	1220	.....	1420	2760	.....	3140	4100	.....	4730	6500	.....	7600	10400	.....	.....	10700	14500	.....	.....
	220	735	1160	.....	1650	2550	.....	.....	3830	.....	3900	6100	.....	6250	8850	.....	.....	.....	.....	.....
50	140	2900	.....	.....	6430	.....	.....	9650	.....	.....	.....	.....	15500	.....	.....	.....	21900	.....	.....	.....
	160	1830	2900	.....	4100	6350	6430	.....	9620	.....	.....	.....	15100	15500	.....	.....	21900	.....	.....	.....
	180	1380	1730	2540	3060	3820	5620	.....	5750	8450	9150	.....	9500	13500	14700	.....	19200	20800	.....	.....
	200	1320	.....	1540	2980	.....	3400	4420	.....	5100	7050	.....	8200	11200	.....	.....	11600	15700	.....	.....
	220	775	1220	.....	1750	2620	.....	.....	3920	.....	4120	6300	.....	6600	8900	.....	.....	9200	.....	.....
60	140	2900	.....	.....	6430	.....	.....	9650	.....	.....	.....	.....	15500	.....	.....	.....	21900	.....	.....	.....
	160	2120	2900	.....	4750	6430	.....	.....	7150	9650	.....	.....	15500	.....	.....	.....	21900	.....	.....	.....
	180	1380	1920	2800	3060	4350	5600	.....	6400	9380	.....	.....	10000	15000	.....	.....	21200	.....	.....	.....
	200	1380	.....	1660	3060	.....	3670	4580	.....	5520	7600	.....	8900	12150	.....	.....	12500	17000	.....	.....
	220	825	1180	.....	1850	2620	.....	.....	3920	.....	4400	6300	.....	7000	8900	.....	.....	9800	.....	.....
100	160	2900	.....	.....	6430	.....	.....	9650	.....	.....	.....	.....	15500	.....	.....	.....	21900	.....	.....	.....
	180	2150	2900	.....	4840	6430	.....	.....	7500	9650	.....	.....	15500	.....	.....	.....	21900	.....	.....	.....
	200	1380	1720	2520	3060	3800	5550	.....	5700	8350	9150	.....	13400	14700	.....	.....	19000	20800	.....	.....
	220	1130	1180	1300	2520	2620	2880	3760	3920	4350	6000	6300	6950	9600	.....	.....	9900	13300	.....	.....
	240	730	860	1025	1380	1880	2280	.....	2820	3410	.....	.....	4500	5470	.....	.....	6600	7720	.....	.....
HOT WATER CONVERTORS — FORCED CIRCULATION																					
160	190	2900	.....	.....	6430	.....	.....	.....	9650	.....	.....	.....	15500	.....	.....	.....	21900	.....	.....	.....

*The Capacity ratings of these tables are conservative and frequently are exceeded in actual operation.

In specifying a particular heater, the desired capacity and temperature range must be given in order to construct the heater with the necessary number of passes. Where no rating is given, a condition exists in which the preceding heater, by its proper pass construction has a greater capacity than the following larger one and therefore would not be economical. Such an occurrence is due to the fact that one

heater may have its highest capacity with a water velocity corresponding to the maximum allowable friction loss at a certain number of passes and the next larger heater must have in consequence a smaller number of passes which decreases the velocity and of necessity depresses the heat transfer rate correspondingly.

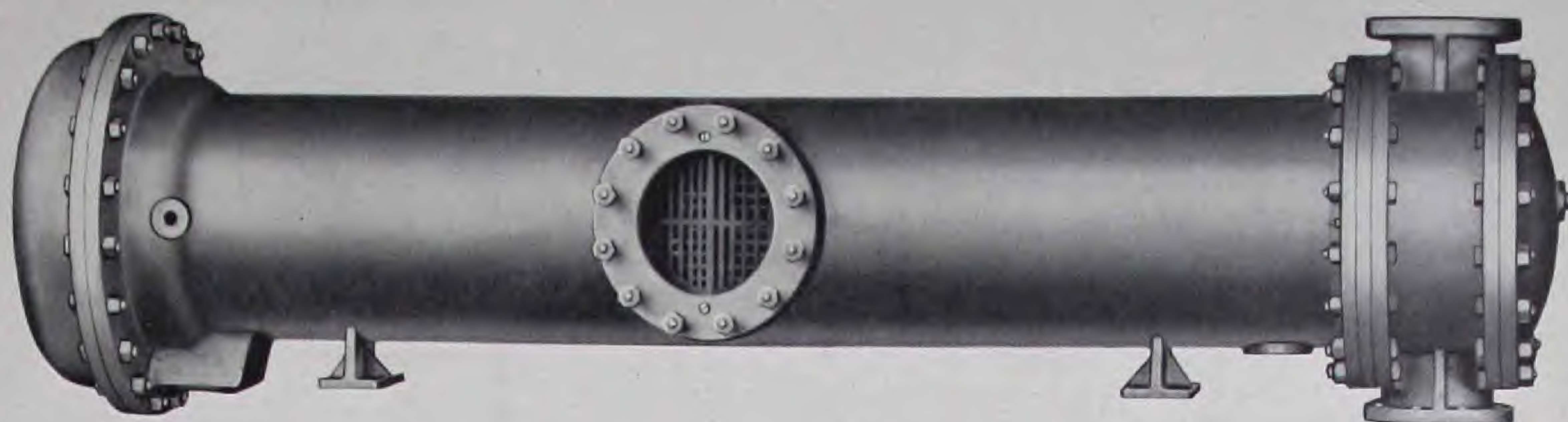
The given capacities are ONLY for water. Regarding capacities for other liquids than water and conditions not listed, consult the nearest Alberger representative or our Office.

***CAPACITY TABLES—ALBERGER TYPE FC—INSTANTANEOUS HEATERS**
FLOATING HEAD TYPE WITH CORRUGATED TUBES

Capacities in gallons per hour										Maximum friction 8 Lbs./sq. in.									
Inlet Temp. ° F.	Outlet Temp. ° F.	Heater Sizes																	
		FC 6A	FC 6B	FC 6C	FC 8A	FC 8B	FC 8C	FC 10-A	FC 10-B	FC 10-C	FC 10-D	FC 12-A	FC 12-B	FC 12-C	FC 12-D	FC 14-A	FC 14-B	FC 14-C	FC 14-D
Steam at 50 Lbs. Gage																			
40	140	2900			6430			9650				15500				21900			
	160	2380	2900		5300	6430		8000	9650			12600	15500			18000	21900		
	180	1520	2400	2900	3400	5300	6430		8000	9650			12500	15500			18200	21900	
	200	1380	1560	2300	3060	3450	5050		5200	7650	9150			12100	14700			17200	20800
	220	1300		1500	2900		3310	4320		5000	6900			8000	11000				15400
50	140	2900			6430			9650				15500				21900			
	160	2720	2900		6100	6430		9150	9650			14400	15500			20500	21900		
	180	1700	2660	2900	3780	5900	6430		8900	9650			13000	15500			20200	21900	
	200	1380	1660	2430	3060	3670	5380		5550	8100	9150			12900	14700			18400	20800
	220	1380		1620	3060		3600	4580		5400	7450			8700	11800			12300	16600
60	140	2900			6430			9650				15500				21900			
	160	2900			6430			9650				15500				21900			
	180	1920	2900		4300	6430			9650			10200	15500				21900		
	200	1380	1860	2730	3060	4110	6050		6200	9120			9800	14500	14700			20600	20800
	220	1380		1740	3060		3800	4580		5750	7950			9200	12600			13000	17600
100	160	2900			6430			9650				15500				21900			
	180	2900			6430			9650				15500				21900			
	200	1920	2900		4280	6430			9650			10100	15500				21900		
	220	1380	1690	2480	3060	3720	5450		5650	8250	9150			13200	14700			18700	20800
	240	1230		1430	2770		3150	4100		4760	6580	6640		7600	10400			10800	14600
	260	730	1080		1530	2360			3560			3660	5600		5800		8200		
HOT WATER CONVERTORS — FORCED CIRCULATION																			
160	190	2900			6430			9650				15500				21900			
Steam at 100 Lbs. Gage																			
40	140	2900			6430			9650				15500				21900			
	160	2900			6430			9650				15500				21900			
	180	2320	2900		5200	6430		7820	9650			12300	15500				21900		
	200	1570	2480	2900	3520	5450	6430		8250	9650			13000	15500			19000	21900	
	220	1380	1700	2500	3060	3770	5550		5700	8350			8950	13300				19000	
50	140	2900			6430			9650				15500				21900			
	160	2900			6430			9650				15500				21900			
	180	2570	2900		5750	6430		8700	9650			13700	15500			19500	21900		
	200	1730	2720	2900	3850	6000	6430		9100	9650			14200	15500			20600	21900	
	220	1380	1850	2710	3060	4100	6000		6150	9050			9650	14400				20500	
60	140	2900			6430			9650				15500				21900			
	160	2900			6430			9650				15500				21900			
	180	2900			6430			9650				15500				21900			
	200	1900	2900		4260	6430			9650				15500				21900		
	220	1380	2000	2900	3060	4430	6430		6700	9650			10400	15500				21900	
100	160	2900			6430			9650				15500				21900			
	180	2900			6430			9650				15500				21900			
	200	2900			6430			9650				15500				21900			
	220	1900	2900		4260	6430			9650				15500				21900		
	240	1380	1870	2470	3060	4140	6050		6220	9150			9800	14600				20700	
	300	730	875	1025	1380	1930	2280		2880	3410		3570	4600	5470			6500	7720	
HOT WATER CONVERTORS — FORCED CIRCULATION																			
160	190	2900			6430			9650				15500				21900			

*See footnote page 11.

Alberger
Instantaneous
Heater, Type FP.



Alberger TYPE FP INSTANTANEOUS HEATERS with PLAIN TUBES

THE Alberger Type FP Instantaneous Heater has its most useful application for heating raw water or viscous liquids, where only a low pressure loss through the heater is permissible, or where the condition of the liquid necessitates frequent cleaning of the tubes; it is also very suitable for extremely high pressure service where tubes of heavy wall thicknesses must be used.

Equipped with plain instead of corrugated tubes but otherwise of the same design and construction as the Type FC Heater previously described, the following outstanding features are retained in the Type FP Heater: accessibility for quick, easy inspection and cleaning of

tubes (if furnished with channel construction without breaking of pipe connections), multi-pass arrangement for high efficiency, floating head to compensate for thermo expansion, tube support plates to prevent vibration of tubes, recessed gaskets for tightness, steam baffle for proper steam distribution, guide pins to prevent sagging of tubes, movable saddles for easy installation, sturdy construction for long life, quality workmanship for accurate assembly.

The following tabulations apply to standard construction, however, Type FP Heaters can be designed to suit special corrosion or pressure conditions.

STANDARD MATERIALS

Shell.....	Cast Iron or Welded Steel
Channel or Bonnet.....	Cast Iron
Channel Cover.....	Cast Iron
Tube Sheets.....	Forged Steel or Bronze

Shell Cover.....	Cast Iron
Floating Head Cover.....	Cast Iron
Saddles.....	Cast Iron
Tubes.....	$\frac{3}{4}$ " O.D. #18 B.W.G. Plain seamless drawn Copper

STANDARD PRESSURES

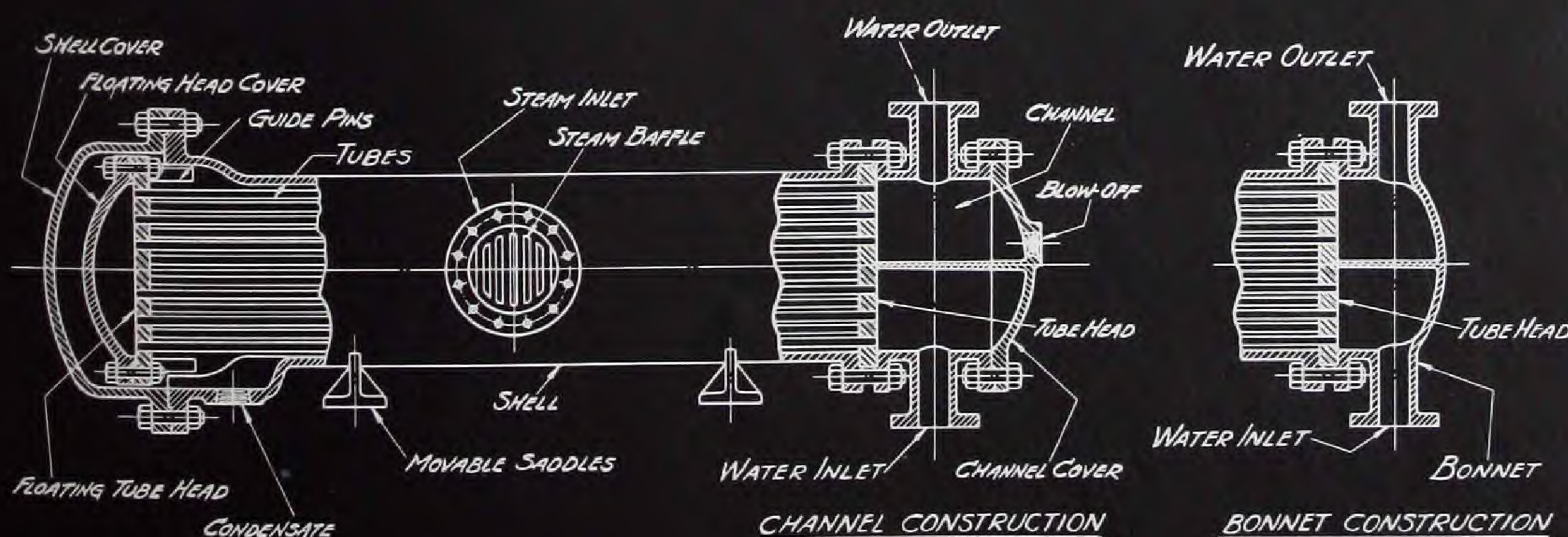
Working Pressure.....	Shell and tube spaces... 125 Lbs./sq. in.
Test Pressure.....	Shell and tube spaces... 200 Lbs./sq. in.

SPECIFICATIONS

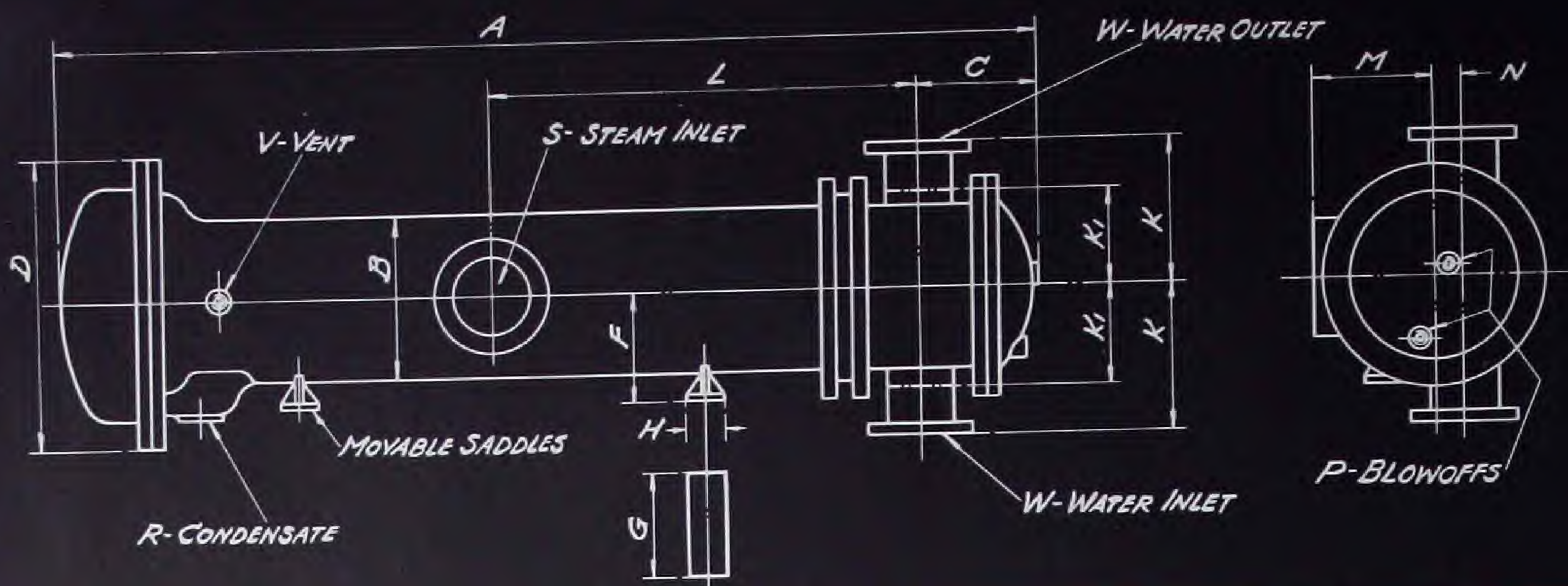
SPECIFY: A {Horizontal
Vertical} Instantaneous Heater of the closed water tube type. It shall be floating head construction and equipped with $\frac{3}{4}$ " O.D. Plain Copper Tubes. The Heater shall be furnished with water channel to permit inspection or removal of tubes without breaking steam or water piping connections. (If a bonnet is desired instead of the channel specify: The heater shall be furnished with the bonnet arrangement.) This heater shall have ample capacity to

heat.....GPH of water (or other liquid) from.....° F. to.....° F., when supplied with sufficient steam at.....Lbs. Gage pressure.

The pressure loss through the tubes shall not exceedLbs./sq. in. The liquid spaces shall be designed for a working pressure of.....Lbs./sq. in., and the steam spaces for a working pressure of.....Lbs./sq. in. The heater shall be Alberger Type FP or equal. Heater to be as described in the Alberger Heater Company Bulletin No. 200.



Sectional Drawing of
an Instantaneous
Heater, Type FP.



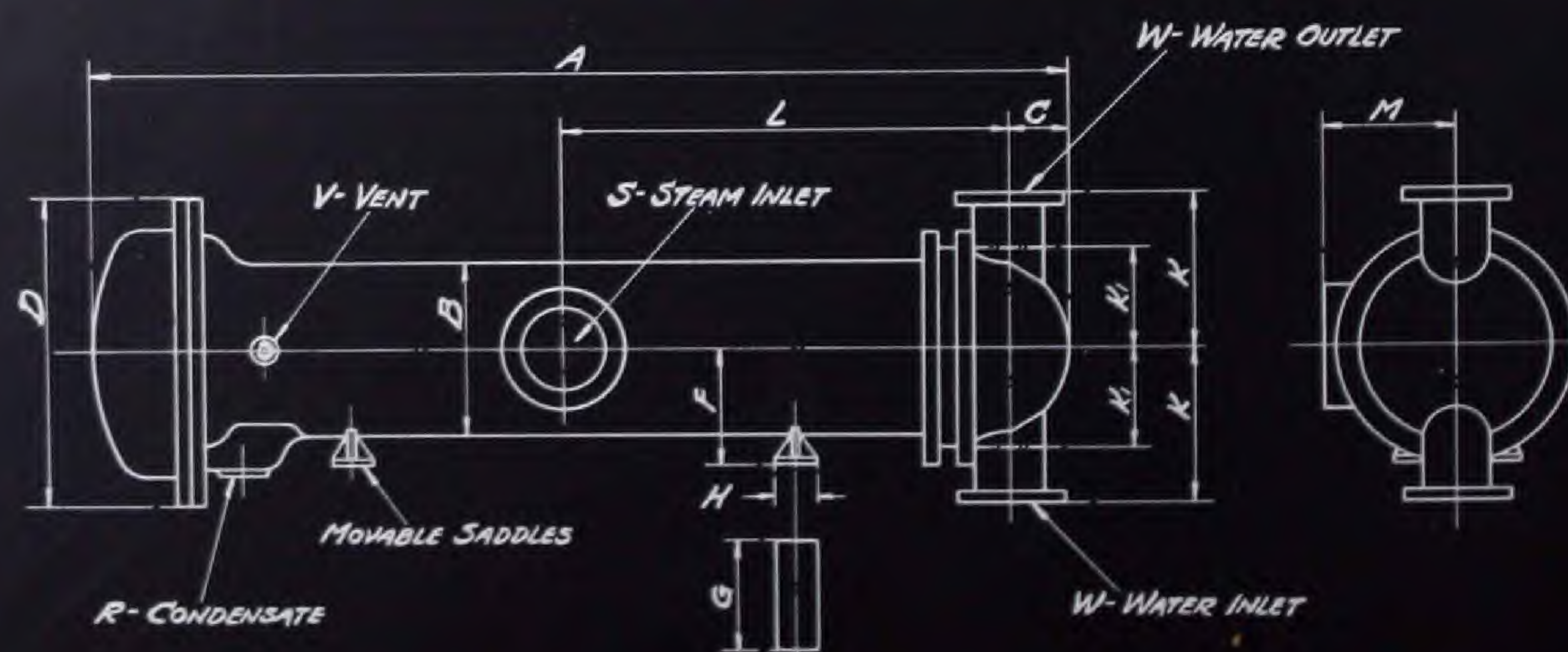
Alberger Horizontal
Instantaneous
Heater, Type FP —
Water Channel Con-
struction.

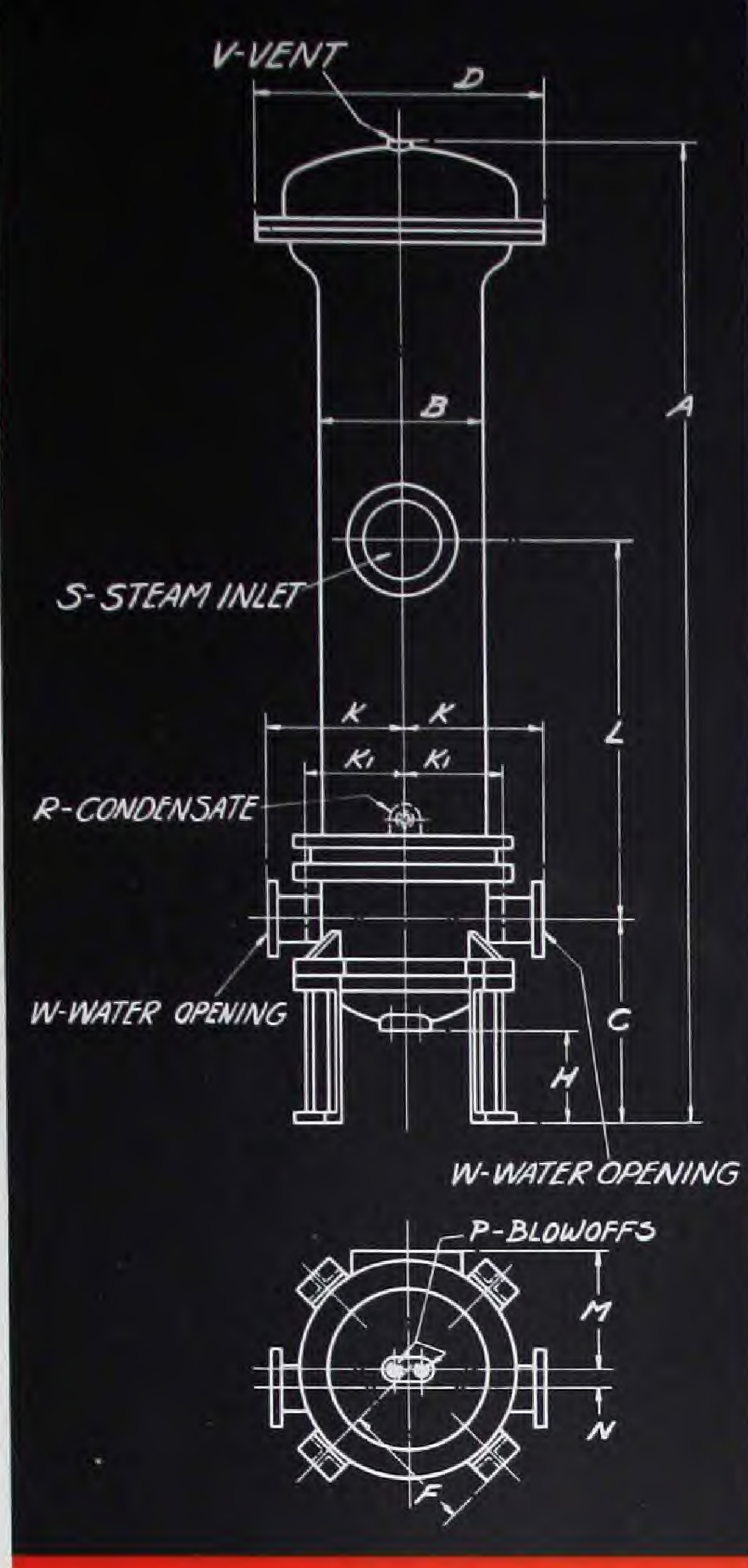
*DIMENSION TABLE — ALBERGER **TYPE FP** INSTANTANEOUS HEATERS
WITH $\frac{3}{4}$ " O.D. PLAIN TUBES

WITH 3/4" O.D. PLAIN TUBES																				
Heater Size		FP 6	FP 6A	FP 8	FP 8A	FP 8B	FP 10	FP 10A	FP 12	FP 12A	FP 14	FP 14A	FP 14B	FP 16	FP 16A	FP 16B	FP 19	FP 19A	FP 21	FP 21A
Horizontal																				
SHELL																				
Cast Iron	B	7 1/2	7 1/2	9 1/4	9 1/4	9 1/4	11 1/4	11 1/4	13 1/4	13 1/4	15 3/8	15 3/8	15 3/8	17 1/2	17 1/2	17 1/2	20 3/4	20 3/4	22 3/4	22 3/4
Welded Steel	B	6 5/8	6 5/8	8 5/8	8 5/8	8 5/8	10 3/4	10 3/4	12 3/4	12 3/4	15	15	15	17	17	17	20	20	22	22
Flanged Tapped	D	13 1/4	13 1/4	15 1/4	15 1/4	15 1/4	19	19	21 1/2	21 1/2	23 1/2	23 1/2	23 1/2	26	26	26	29	29	32 1/2	32 1/2
	F	5 3/4	5 3/4	6 1/2	6 1/2	6 1/2	9	9	10	10	11	11	11	12	12	12	14 1/2	14 1/2	15 3/4	15 3/4
	G	6	6	6	6	6	8	8	10	10	12	12	12	12	12	12	14	14	14	14
	H	3	3	3	3	3	3	3	4	4	4	4	4	5	5	5	5	5	5	5
	K	...	...	...	...	...	10	10	11	11	12 1/2	12 1/2	12 1/2	13 3/4	13 3/4	13 3/4	15 1/2	15 1/2	17	17
	K1	4	4	5	5	5	13 1/2	13 1/2	14 1/2	14 1/2
M	6 1/2	6 1/2	7 1/2	7 1/2	7 1/2	8	8	9	9	9	10 1/2	10 1/2	10 1/2	12	12	12	13 1/2	13 1/2	14 1/2	14 1/2
OPENINGS																				
Condensate	R	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	2	2	2 1/2	2 1/2	3	3	3	3	3	3	4	4	4	4
Steam	S	3	3	4	4	4	5	5	6	6	8	8	8	10	10	10	12	12	12	12
Vent	V	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	3 3/4	3 3/4	4 3/4	4 3/4	4 3/4	4 3/4	4 3/4	6 3/4	6 3/4	6 3/4	6	6	8	8
Water	W	2	2	2 1/2	2 1/2	2 1/2	3	3	4	4	4	4	4	6	6	6	6	6	8	8
CHANNEL TYPE	A	61 1/2	73 1/2	62	86	110	90 1/2	114 1/2	90 1/2	114 1/2	102 1/2	114 1/2	138 1/2	115 1/2	139 1/2	163 1/2	119 1/2	143 1/2	143 1/2	167 1/2
	C	5 3/4	5 3/4	5 3/4	5 3/4	5 3/4	8 1/4	8 1/4	8 1/4	8 1/4	8 1/4	8 1/4	8 1/4	8 3/8	8 3/8	8 3/8	11	11	10 1/4	10 1/4
	L	13 3/4	13 3/4	13 3/4	38 1/2	50 1/2	40	52	39 3/4	51 3/4	45 3/4	51 3/4	63 3/4	51	63	75	50 1/2	62 1/2	61 1/2	73 1/2
	N	1 1/2	1 1/2	1 1/2	1 3/4	1 3/4	1 3/4	1 3/4	2 3/8	2 3/8	2 3/8	2 3/8	2 3/8	3 3/8	3 3/8	3 3/8	3 3/8	3 3/8	4 1/2	4 1/2
	P	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2
BONNET TYPE	A	58 1/2	70 1/2	60	84	108	86 1/2	110 1/2	88	112	100	112	136	114 1/2	138 1/2	162 1/2	116	140	142	166
	C	2 3/4	2 3/4	3 1/4	3 1/4	3 1/4	4 1/2	4 1/2	5	5	5	5	5	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	6 3/4	6 3/4
	L	13 1/4	13 1/4	13 3/4	38 1/2	50 1/2	39 1/2	51 1/2	40 1/2	52 1/2	46 1/2	52 1/2	64 1/2	52 1/2	64 1/2	76 1/2	51 1/2	63 1/2	63 1/2	75 1/2

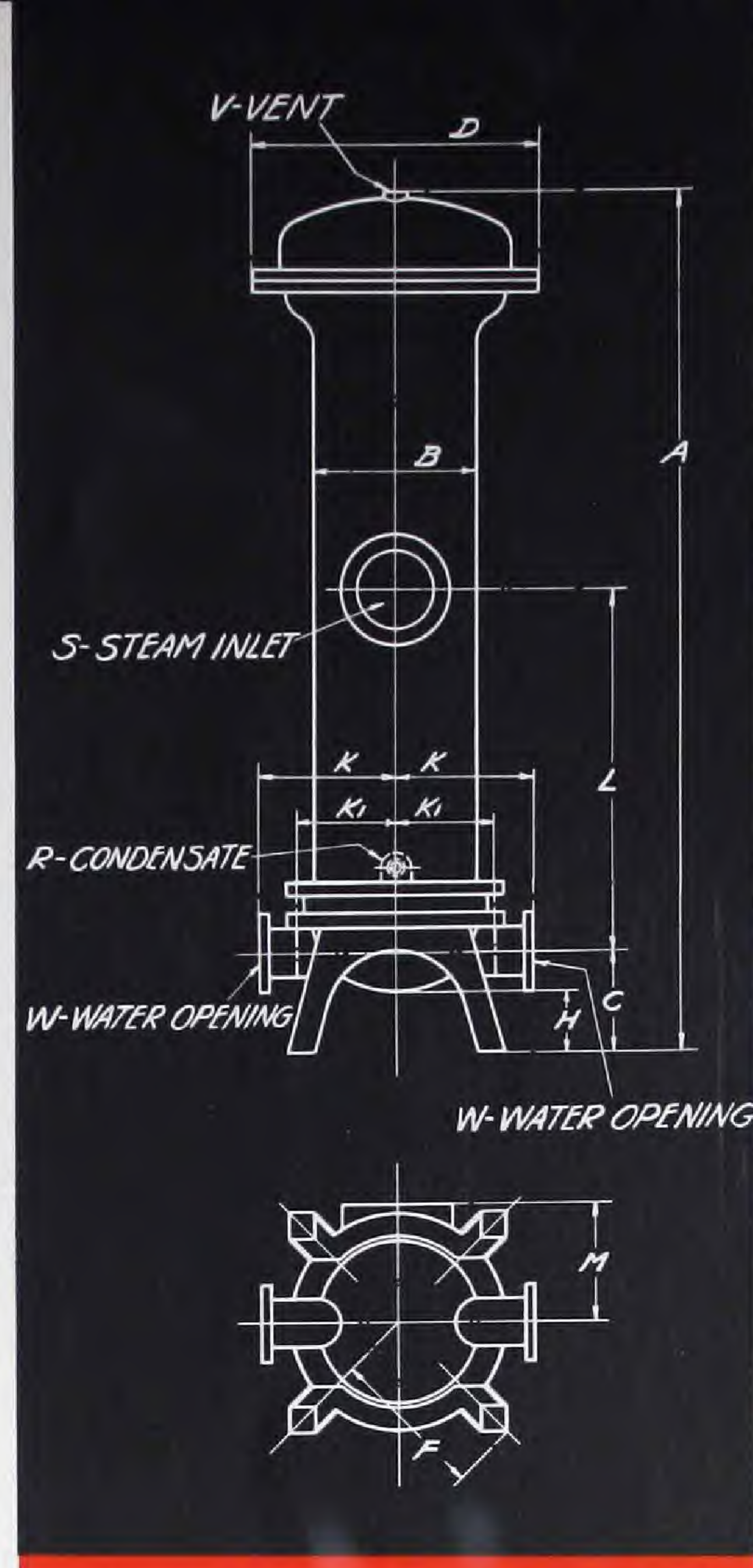
* All dimensions are in inches. Flanged openings are faced and drilled 125 lbs. American Standard.

Alberger Horizontal
Instantaneous
Heater, Type FP —
Bonnet Construc-
tion.





Alberger Vertical Instantaneous Heater, Type FP—Channel Construction.



Alberger Vertical Instantaneous Heater, Type FP—Bonnet Construction.

*DIMENSION TABLE — ALBERGER **TYPE FP** INSTANTANEOUS HEATERS
WITH $\frac{3}{4}$ " O.D. PLAIN TUBES

Heater Size		FP 6	FP 6A	FP 8	FP 8A	FP 8B	FP 10	FP 10A	FP 12	FP 12A	FP 14	FP 14A	FP 14B	FP 16	FP 16A	FP 16B	FP 19	FP 19A	FP 21	FP 21A	
Vertical																					
SHELL																					
Cast Iron	B	7 $\frac{1}{2}$	7 $\frac{1}{2}$	9 $\frac{1}{4}$	9 $\frac{1}{4}$	9 $\frac{1}{4}$	11 $\frac{1}{4}$	11 $\frac{1}{4}$	13 $\frac{1}{4}$	13 $\frac{1}{4}$	15 $\frac{3}{8}$	15 $\frac{3}{8}$	15 $\frac{3}{8}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$	20 $\frac{3}{4}$	20 $\frac{3}{4}$	22 $\frac{3}{4}$	22 $\frac{3}{4}$	
Welded Steel	B	6 $\frac{5}{8}$	6 $\frac{5}{8}$	8 $\frac{5}{8}$	8 $\frac{5}{8}$	8 $\frac{5}{8}$	10 $\frac{3}{4}$	10 $\frac{3}{4}$	12 $\frac{3}{4}$	12 $\frac{3}{4}$	15	15	15	17	17	17	20	20	22	22	
Flanged Tapped	D	13 $\frac{1}{2}$	13 $\frac{1}{2}$	15 $\frac{1}{4}$	15 $\frac{1}{4}$	15 $\frac{1}{4}$	19	19	21 $\frac{1}{2}$	21 $\frac{1}{2}$	23 $\frac{1}{2}$	23 $\frac{1}{2}$	23 $\frac{1}{2}$	26	26	26	29	29	32 $\frac{1}{2}$	32 $\frac{1}{2}$	
	K	...	...	...	...	...	10	10	11	11	12 $\frac{1}{2}$	12 $\frac{1}{2}$	12 $\frac{1}{2}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	15 $\frac{1}{2}$	15 $\frac{1}{2}$	17	17
	K ₁	4	4	5	5	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	M	6 $\frac{1}{2}$	6 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	8	8	9	9	10 $\frac{1}{2}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$	12	12	12	13 $\frac{1}{2}$	13 $\frac{1}{2}$	14 $\frac{1}{2}$	14 $\frac{1}{2}$	
OPENINGS																					
Condensate	R	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2	2	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3	3	3	3	3	3	4	4	4	4	
Steam	S	3	3	4	4	4	5	5	6	6	8	8	8	10	10	10	12	12	12	12	
Vent	V	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	1	1	1	1	
Water	W	2	2	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3	3	4	4	4	4	4	6	6	6	6	6	8	8	
CHANNEL TYPE	A	68 $\frac{1}{2}$	80 $\frac{1}{2}$	71	95	119	99 $\frac{1}{2}$	123 $\frac{1}{2}$	99 $\frac{1}{2}$	123 $\frac{1}{2}$	111 $\frac{1}{2}$	123 $\frac{1}{2}$	147 $\frac{1}{2}$	124 $\frac{1}{2}$	148 $\frac{1}{2}$	172 $\frac{1}{2}$	128 $\frac{1}{2}$	152 $\frac{1}{2}$	152 $\frac{1}{2}$	176 $\frac{1}{2}$	
	C	12 $\frac{3}{4}$	12 $\frac{3}{4}$	14 $\frac{3}{4}$	14 $\frac{3}{4}$	14 $\frac{3}{4}$	17 $\frac{1}{4}$	17 $\frac{1}{4}$	17 $\frac{1}{4}$	17 $\frac{1}{4}$	17 $\frac{1}{4}$	17 $\frac{1}{4}$	17 $\frac{1}{4}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$	20	20	19 $\frac{1}{4}$	19 $\frac{1}{4}$	
	F	8	8	9	9	9	10 $\frac{1}{2}$	10 $\frac{1}{2}$	12	12	13 $\frac{1}{2}$	13 $\frac{1}{2}$	13 $\frac{1}{2}$	15	15	15	16 $\frac{1}{2}$	16 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$	
	H	7	7	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	
	L	13 $\frac{3}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	38 $\frac{1}{2}$	50 $\frac{1}{2}$	40	52	39 $\frac{3}{4}$	51 $\frac{3}{4}$	45 $\frac{3}{4}$	51 $\frac{3}{4}$	63 $\frac{3}{4}$	51	63	75	50 $\frac{1}{2}$	62 $\frac{1}{2}$	61 $\frac{1}{2}$	73 $\frac{1}{2}$	
	P	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	2 $\frac{3}{8}$	2 $\frac{3}{8}$	2 $\frac{3}{8}$	2 $\frac{3}{8}$	2 $\frac{3}{8}$	3 $\frac{3}{8}$	3 $\frac{3}{8}$	3 $\frac{3}{8}$	3 $\frac{3}{8}$	3 $\frac{3}{8}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	
BONNET TYPE	A	62 $\frac{1}{2}$	74 $\frac{1}{2}$	64	88	112	92 $\frac{1}{2}$	116 $\frac{1}{2}$	94	118	107 $\frac{1}{2}$	119 $\frac{1}{2}$	143 $\frac{1}{2}$	122	146	170	123 $\frac{1}{2}$	147 $\frac{1}{2}$	149 $\frac{1}{2}$	173 $\frac{1}{2}$	
	C	6 $\frac{3}{4}$	6 $\frac{3}{4}$	7 $\frac{1}{4}$	7 $\frac{1}{4}$	7 $\frac{1}{4}$	10 $\frac{1}{4}$	10 $\frac{1}{4}$	10 $\frac{3}{4}$	10 $\frac{3}{4}$	12	12	12	12 $\frac{3}{4}$	12 $\frac{3}{4}$	12 $\frac{3}{4}$	12 $\frac{3}{4}$	12 $\frac{3}{4}$	14	14	
	F	8 $\frac{1}{2}$	8 $\frac{1}{2}$	10	10	10	12	12	14 $\frac{1}{4}$	14 $\frac{1}{4}$	15 $\frac{3}{4}$	15 $\frac{3}{4}$	15 $\frac{3}{4}$	17 $\frac{1}{4}$	17 $\frac{1}{4}$	17 $\frac{1}{4}$	19 $\frac{1}{2}$	19 $\frac{1}{2}$	21	21	
	H	4	4	4	4	4	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	7 $\frac{1}{4}$	7 $\frac{1}{4}$	7 $\frac{1}{4}$	7 $\frac{1}{4}$	7 $\frac{1}{4}$	7 $\frac{1}{4}$	7 $\frac{1}{4}$	7 $\frac{1}{4}$	7 $\frac{1}{4}$	7 $\frac{1}{4}$	
	L	13 $\frac{1}{4}$	13 $\frac{1}{4}$	13 $\frac{3}{4}$	38 $\frac{1}{2}$	50 $\frac{1}{2}$	39 $\frac{1}{2}$	51 $\frac{1}{2}$	40 $\frac{1}{2}$	52 $\frac{1}{2}$	46 $\frac{1}{2}$	52 $\frac{1}{2}$	64 $\frac{1}{2}$	52 $\frac{1}{2}$	64 $\frac{1}{2}$	76 $\frac{1}{2}$	51 $\frac{1}{2}$	63 $\frac{1}{2}$	63 $\frac{1}{2}$	75 $\frac{1}{2}$	

* All dimensions are in inches. Flanged openings are faced and drilled 125 lbs. American Standard.

*CAPACITY TABLES—ALBERGER **TYPE FP** and **TYPE U**—INSTANTANEOUS HEATERS

Capacity in gallons per hour										Maximum friction loss 5 Lbs./sq. in.					
Inlet Temp. ° F.	Outlet Temp. ° F.	Heater Sizes													
		U-5	U-5A	FP-6 U-6	FP-6A U-6A	FP-8 U-8	FP-8A U-8A	FP-8B U-8B	FP-10 U-10	FP-10A U-10A	FP-12 U-12	FP-12A U-12A	FP-14 U-14	FP-14A U-14A	FP-14B U-14B
Steam at 0 Lb. Gage															
40	80	1225	2125	3350	4780	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....
	140	375	415	920	1450	2330	3650	.....	6300	.....	10000	.....	13200	.....	21000
	160	240	375	660	1180	1500	1930	3120	3390	5470	.....	8600	10600	12300	11500
	180	120	225	330	760	830	1500	1780	2550	3200	4000	4950	6950	7100	11000
	200	48	90	135	310	330	800	1120	1380	1925	2150	3000	4400	4250	6160
50	80	2000	2125	4780	.....	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....
	140	375	480	1060	1700	2330	3650	3840	6395	6920	10000	10700	13200	15200	24500
	160	265	375	725	1200	1500	2170	3120	3670	5470	6000	8600	11700	12300	12500
	180	128	240	350	760	880	1600	1910	2730	3420	4300	5300	6950	7600	11000
	200	50	92	135	325	340	830	1120	1400	2000	2250	3100	4500	4400	6160
60	140	375	565	1260	2000	2330	3650	4525	6390	8200	10000	12700	13600	18000	28600
	160	295	375	810	1200	1510	2460	3120	4140	5470	6700	8600	13200	.....	14000
	180	138	260	385	760	950	1744	2060	2950	3700	4650	5750	6950	8300	11000
	200	52	98	145	340	360	875	1165	1480	2100	2350	3250	4525	4650	6160
100	160	375	525	1160	1840	2330	3650	4200	6390	7600	10000	11700	13200	16700	26700
	180	215	375	590	1050	1475	1930	3120	3390	5470	5410	8600	9650	12300	11000
	200	68	125	185	440	465	1140	1500	1920	2700	3050	4200	4550	6000	6500
HOT WATER CONVERTOR RANGE — FORCED CIRCULATION															
160	190	375	425	1070	1700	2330	3650	.....	6400	.....	10000	.....	13200	13500	21500
Steam at 2 Lbs. Gage															
40	80	1300	2125	3570	4780	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....
	140	375	460	1015	1640	2330	3650	3720	6390	6650	10000	10500	13200	14700	23500
	160	270	375	740	1200	1500	2240	3120	3800	5470	6050	8600	12000	12300	12700
	180	140	265	390	760	970	1780	2110	3000	3770	4800	5900	6950	8400	11000
	200	64	120	178	425	440	1080	1440	1830	2570	2900	4000	4525	5750	6160
50	80	2125	.....	4780	.....	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....
	140	375	535	1200	1880	2330	3650	4250	6390	7700	10000	12000	13200	17000	27200
	160	300	375	820	1200	1530	2480	3120	4220	5470	6700	8600	13200	.....	14000
	180	152	285	425	760	1050	1920	2280	3250	4080	5150	6350	6950	9100	11000
	200	67	126	185	450	465	1180	1520	1930	2720	3060	4250	4525	6000	6500
60	140	375	630	1310	2220	2350	3650	5000	6390	9000	10000	14100	15200	20000	30500
	160	335	375	830	1200	1730	2800	3120	4800	5470	7600	8600	13200	.....	16000
	180	166	310	460	820	1140	1930	2480	3390	4420	5410	6900	7500	9900	11000
	200	71	135	200	475	490	1200	1600	2040	2870	3100	4500	4800	6400	6850
100	160	375	625	1310	2000	2330	3650	5000	6390	8950	10000	14000	15000	20000	30500
	180	265	375	735	1200	1500	2240	3120	3750	5470	6000	8600	11900	12300	12600
	200	95	178	265	630	655	1225	1665	2140	2920	3370	4580	6400	6550	9100
HOT WATER CONVERTOR RANGE — FORCED CIRCULATION															
160	190	375	590	1310	2100	2330	3650	4750	6390	8500	10000	13400	14300	19000	30000
Steam at 5 Lbs. Gage															
40	80	1500	.....	4050	4780	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....
	140	375	540	1200	1900	2330	3650	4300	6390	7700	10000	12000	13200	17000	27400
	160	325	375	840	1200	1650	2680	3120	4500	5470	7200	8600	13200	.....	15300
	180	180	325	480	880	1200	1930	2625	3390	4680	5410	7350	7900	10400	11000
	200	90	170	245	500	620	1230	1665	2140	2920	3370	4580	6000	6550	8550
	210	60	110	160	385	400	980	1310	1650	2350	2650	3650	4525	5200	6160
50	80	2125	.....	4780	.....	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....
	140	375	630	1310	2200	2350	3650	5000	6390	9000	10000	14000	15000	20000	30500
	160	360	375	840	1200	1830	3000	3120	5050	5470	8000	8600	13200	.....	17100
	180	195	360	520	960	1320	1930	2860	3390	5100	5410	8000	8600	11400	11000
	200	95	175	260	630	655	1230	1665	2140	2920	3370	4580	6400	6550	9050
	210	60	115	165	335	420	1030	1360	1720	2450	2750	3800	4525	5450	6160
60	140	400	740	1310	2250	2700	3650	5900	6390	10600	.....	16500	17800	23500	30500
	160	375	380	850	1345	2080	3400	.....	5700	.....	9100	.....	13200	.....	19300
	180	215	375	570	1050	1440	1930	3120	3390	5470	.....	8600	9400	12500	11000
	200	105	190	275	670	700	1250	1665	2180	2920	3430	4580	6800	6550	9650
	210	65	120	175	425	445	1080	1430	1820	2580	2920	4000	4525	5750	6200
100	160	420	770	1310	2250	2800	3650	6150	6390	11000	.....	17200	18400	24300	30500
	180	350	375	840	1200	1750	2850	3125	4800	5470	7750	8600	13200	.....	16200
	200	140	260	385	760	970	1770	2100	3000	3750	4750	5850	6950	8350	11000
	210	85	155	225	540	570	1225	1665	2140	2920	3370	4580	5550	6550	7850
HOT WATER CONVERTOR RANGE — FORCED CIRCULATION															
160	190	500	890	1320	2250	3250	4000	7150	.....	12800	.....	20000	21500	28400	30500

* See footnote, page 17.

***CAPACITY TABLES—ALBERGER TYPE FP and TYPE U—INSTANTANEOUS HEATERS**

Capacity in gallons per hour		Maximum friction loss 5 Lbs./sq. in													
Inlet Temp. ° F.	Outlet Temp. ° F.	Heater Sizes													
		U-5	U-5A	FP-6 U-6	FP-6A U-6A	FP-8 U-8	FP-8A U-8A	FP-8B U-8B	FP-10 U-10	FP-10A U-10A	FP-12 U-12	FP-12A U-12A	FP-14 U-14	FP-14A U-14A	FP-14B U-14B
Steam at 10 Lbs. Gage															
40	80	1740	2125	4650	4780	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....
	140	375	645	1310	2250	2375	3650	5150	6390	9200	10000	14400	15500	20500	30500
	160	375	.....	840	1200	2025	3300	.....	5600	5470	8900	.....	13200	.....	19000
	180	230	375	620	1140	1500	1930	3120	3390	5470	.....	8600	10200	12300	.....
	200	130	235	345	760	875	1600	1900	2700	3390	4280	5300	6950	7500	11000
	220	62	114	165	400	420	1000	1360	1700	2450	2750	3800	4525	5450	6160
50	80	2125	.....	4780	.....	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....
	140	410	750	1310	2250	2750	3650	6000	6390	10800	.....	16700	18000	23800	30500
	160	375	415	920	1470	2275	3650	.....	6300	5900	10000	.....	13200	.....	21000
	180	250	375	675	1200	1500	2100	3120	3390	5470	5600	8600	11200	12300	.....
	200	135	250	370	760	930	1700	2020	2880	3600	4550	5650	6950	8000	11000
	220	65	120	175	420	440	1070	1420	1800	2560	2900	4000	4525	5700	6160
60	140	490	900	1330	2250	3300	4000	7200	.....	12900	.....	20000	21500	27500	30500
	160	375	470	1050	1670	2600	3650	3800	6390	6750	10000	10500	13200	15000	24200
	180	280	375	745	1200	1500	2300	3120	3870	5470	6200	8600	12300	.....	13100
	200	150	270	400	760	1000	1830	2180	3100	3900	4900	6100	6950	8650	11000
	220	67	125	183	445	465	1120	1500	1880	2600	3050	4200	4525	6000	6450

100	160	540	985	1460	2250	3600	4400	7900	.....	14000	.....	22000	23600	31000	.....
	180	375	430	955	1520	2360	3650	.....	6390	.....	10000	.....	13200	13600	22000
	200	210	375	570	1040	1430	1930	3120	3390	5550	5410	8600	9400	12300	.....
	220	85	160	230	560	580	1225	1665	2140	2920	3370	4580	5700	6550	8150

HOT WATER CONVERTOR RANGE — FORCED CIRCULATION															
160	190	740	1060	2000	2300	4250	6050	8500	10400	14850	17200	23300	32000	33500	.....
Steam at 25 Lbs. Gage															
40	80	2125	.....	4780	.....	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....
	140	500	920	1360	2250	3350	4125	7350	.....	13200	.....	20500	22000	33500	.....
	160	375	540	1210	1930	2330	3650	4350	6390	7800	10000	12100	13200	17200	27500
	180	370	375	840	1200	1850	3025	3120	5100	5470	8150	8600	13200	.....	17000
	200	230	375	600	1110	1500	1930	3120	3390	5470	.....	8600	10000	12300	.....
	220	135	250	360	760	910	1680	2000	2850	3550	4500	5550	6950	7900	11000
50	80	2125	.....	4780	.....	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....
	140	590	1060	1600	2250	3950	4850	8500	.....	14850	.....	23300	25700	33500	.....
	160	375	615	1310	2200	2330	3650	4950	6390	8900	10000	13800	14800	19600	30500
	180	375	375	840	1320	2050	3310	.....	5600	.....	9000	.....	13200	.....	18700
	200	245	375	650	1200	1500	2025	3120	3410	5470	.....	8600	10800	12300	.....
	220	145	260	385	760	960	1770	2100	3000	3750	4750	5850	6950	8350	11000
60	140	710	1060	1930	2300	4250	5830	8500	10000	14850	16700	23300	31000	33500	.....
	160	390	715	1310	2250	2625	3650	5750	6390	10300	.....	16000	17200	22800	30500
	180	375	410	840	1475	2260	3650	.....	6250	.....	10000	.....	13200	.....	21000
	200	265	375	710	1200	1500	2180	3120	3670	5470	5900	8600	11700	12300	.....
	220	154	280	410	760	1025	1880	2230	3190	4000	5050	6250	6950	8900	11000

100	160	860	1060	2320	2770	4250	7050	8500	12000	14850	20000	23300	33500	.....	.....
	180	400	730	1310	2250	2680	3650	5850	6390	10500	.....	16300	17500	23200	30500
	200	375	.....	840	1300	2030	3300	.....	5550	.....	8900	.....	13200	.....	18600
	220	210	375	555	1020	1400	1930	3040	3390	5420	.....	8500	9150	12100	.....
	240	100	180	265	650	670	1240	1665	2140	2920	3370	4585	6600	6550	9400

HOT WATER CONVERTOR RANGE — FORCED CIRCULATION															
160	190	1060	1450	2390	4780	5300	8500	.....	14850	.....	23300	.....	33500	.....	.....

*The Capacity ratings of these tables are conservative and frequently are exceeded in actual operation.

In specifying a particular heater, the desired capacity and temperature range must be given in order to construct the heater with the necessary number of passes. Where no rating is given, a condition exists in which the preceding heater, by its proper pass construction has a greater capacity than the following larger one and therefore would not be economical. Such an occurrence is due to the fact that one

heater may have its highest capacity with a water velocity corresponding to the maximum allowable friction loss at a certain number of passes and the next larger heater must have in consequence a smaller number of passes which decreases the velocity and of necessity depresses the heat transfer rate correspondingly.

The given capacities are ONLY for water. Regarding capacities for other liquids than water and conditions not listed, consult the nearest Alberger representative or our Office.

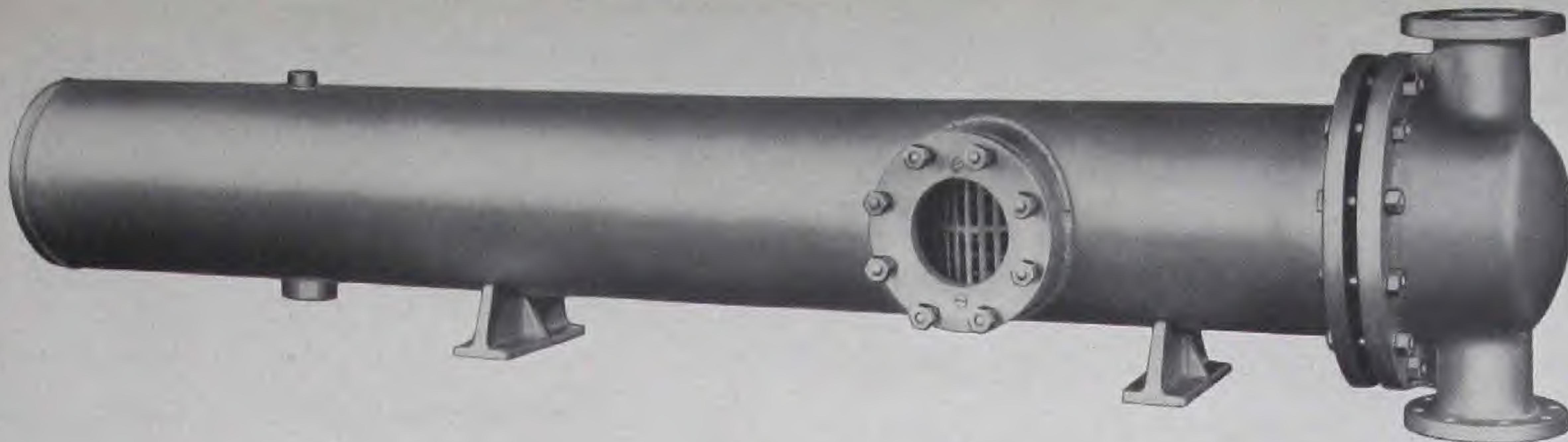
***CAPACITY TABLES—ALBERGER TYPE FP and TYPE U—INSTANTANEOUS HEATERS**

Capacity in gallons per hour		Maximum friction loss 5 Lbs./sq. in.													
Inlet Temp. ° F.	Outlet Temp. ° F.	Heater Sizes													
		U-5	U-5A	FP-6 U-6	FP-6A U-6A	FP-8 U-8	FP-8A U-8A	FP-8B U-8B	FP-10 U-10	FP-10A U-10A	FP-12 U-12	FP-12A U-12A	FP-14 U-14	FP-14A U-14A	FP-14B U-14B
Steam at 50 Lbs. Gage															
40	80	2125	.....	4780	.....	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....
	140	710	1060	1930	2300	4250	5800	8500	10000	14850	16600	23000	31000	33500	.....
	160	435	805	1310	2250	2950	3650	6450	.....	11500	.....	18000	19300	25500	30500
	180	375	515	1140	1820	2330	3650	4100	6390	7350	10000	11400	13200	16300	26200
	200	375	375	840	1200	1850	3000	3120	5050	5470	8100	8600	13200	.....	17000
	220	240	375	640	1170	1500	1980	3120	3390	5470	.....	8600	10500	12300	.....
50	80	2125	.....	4780	.....	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....
	140	840	1060	2280	2725	4250	6950	8500	11800	14850	19700	23300	33500	.....	.....
	160	500	920	1370	2250	3360	4125	7350	.....	13200	.....	20500	22000	28200	30500
	180	375	570	1270	2000	2330	3650	4550	6390	8150	10000	12700	13700	18100	28800
	200	375	.....	840	1260	1960	3200	.....	5400	5470	8600	.....	13200	.....	18000
	220	260	375	695	1200	1500	3130	.....	3600	5470	5750	8600	11400	12300	12100
60	140	880	1060	2390	2850	4250	7250	8500	12400	14850	20500	23300	33500	.....	.....
	160	575	1050	1670	2250	3860	4750	8450	.....	14850	.....	23300	25300	33500	.....
	180	375	650	1310	2250	2380	3650	5150	6390	9250	10000	14400	15500	20600	30500
	200	375	400	890	1410	2210	3600	.....	6050	5700	9600	.....	13200	.....	20200
	220	275	375	780	1200	1500	2270	3120	3830	5470	6150	8600	12200	12300	12800
100	160	1060	1210	2390	4250	4425	8500	.....	14850	.....	23300	.....	33500	.....	.....
	180	640	1060	1740	2250	4250	5250	8500	9000	14850	15000	23300	28200	33500	.....
	200	375	645	1310	2250	2370	3650	5150	6390	9250	10000	14400	15500	20500	30500
	220	375	.....	840	1280	2000	3250	.....	5450	5470	8800	.....	13200	.....	18300
	240	230	375	600	1120	1500	1930	3120	3390	5470	.....	8600	10000	12300	.....
	260	125	230	335	760	850	1560	1850	2650	3300	4150	5150	6950	7300	11000
HOT WATER CONVERTOR RANGE — FORCED CIRCULATION															
160	190	1410	2125	3800	4780	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....
Steam at 100 Lbs. Gage															
40	80	2125	.....	4780	.....	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....
	140	1030	1060	2390	3325	4250	8500	.....	14400	.....	23300	.....	33500	.....	.....
	160	645	1060	1760	2250	4250	5350	8500	9100	14850	15100	23000	27800	33500	.....
	180	425	785	1310	2250	2860	3650	6300	6390	11300	.....	17500	18400	25000	30500
	200	375	530	1180	1880	2330	3650	4250	6390	7600	10000	11800	13200	16800	27000
	220	375	.....	840	1200	2020	3280	.....	5500	.....	8850	.....	13200	.....	18600
50	80	2125	.....	4780	.....	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....
	140	1060	1150	2390	3950	4250	8500	.....	14850	.....	23300	.....	33500	.....	.....
	160	735	1060	2000	2400	4250	6100	8500	10400	14850	17300	23300	31700	33500	.....
	180	475	870	1310	2250	3200	3800	7000	.....	12500	.....	19400	20300	27500	30500
	200	375	580	1300	2050	2330	3650	4650	6390	8300	10000	13000	13600	18500	29300
	220	375	400	885	1400	2180	3550	.....	5900	.....	9600	.....	13200	.....	20200
60	140	1060	1370	2390	4780	5000	8500	.....	14850	.....	23300	.....	33500	.....	.....
	160	865	1060	2350	2800	4250	7150	8500	12100	14850	20300	23300	33500	.....	.....
	180	535	1000	1460	2250	3620	4450	7900	.....	14100	.....	22000	23000	31400	.....
	200	385	640	1310	2250	2350	3650	5150	6390	9200	10000	14300	15000	20400	30500
	220	375	430	950	1520	2330	3650	.....	6390	.....	10000	.....	13200	13700	22000
100	160	1060	1880	2750	4780	6800	8500	.....	14800	.....	23300	.....	33500	.....	.....
	180	1030	1060	2390	3550	4250	8500	.....	14400	.....	23300	.....	33500	.....	.....
	200	575	1060	1570	2250	3870	4750	8500	.....	14850	.....	23300	24700	33500	.....
	220	375	640	1310	2250	2350	3650	5150	6390	9200	10000	14300	15000	20400	30500
	240	375	400	910	1450	2260	3650	.....	6200	.....	9650	.....	13200	.....	20400
	300	100	185	275	550	690	1260	1665	2160	2920	3400	4580	6700	.....	9600
HOT WATER CONVERTOR RANGE — FORCED CIRCULATION															
160	190	2125	.....	4780	.....	8500	.....	.....	14850	.....	23300	.....	33500	.....	.....

* See footnote page 17.

Alberger Instantaneous Heater, Type U.

Alberger
TYPE U



INSTANTANEOUS HEATERS with U-BEND TUBES

THE foremost advantage of the Alberger Type U Instantaneous Heater lies in its simplicity of the design and low first cost. It is best suited for heating clean water or liquids which do not have a tendency to foul or scale the inside of the tubes. Where severe fouling or scaling conditions exist, Alberger Type FC or FP Heaters are more preferable because straight tubes can more readily be cleaned.

The heating element of the Type U Heater consists of a group of U-shaped tubes, expanded at each end into the tube sheet. Alberger U-bends are formed by drawing each tube over a mandrel while bending; a method that assures full wall thickness and area in the bend.

By proper baffle arrangement, the liquid can be multi-passed through the heater to obtain high heat transfer.

The tube bundle can be removed from the shell for inspection and cleaning the outside of the tubes.

Each single U-bend compensates independently from the others for thermal expansion and contraction. Tube support plates are provided to prevent vibration of the tubes and to support the element in the shell. All joints have recessed gasket surfaces for tightness and long life of the packing. A steam baffle properly distributes the entering steam and protects the tubes from direct impingement. The same quality of material and workmanship and the same sturdy construction eminent in Type FC and FP Heaters distinguish Alberger Type U Heaters. The following tabulations apply to standard construction only; as all Alberger equipment, Type U Heaters can be built to suit special corrosion or pressure conditions.

STANDARD MATERIALS

Shell.....	Cast Iron or Welded Steel
Bonnet.....	Cast Iron
Tube Sheet.....	Forged Steel or Bronze

Support Plates.....	Steel or Brass
Saddles.....	Cast Iron
Tubes.....	$\frac{3}{4}$ " O.D. #18 B.W.G. U-bend seamless drawn Copper

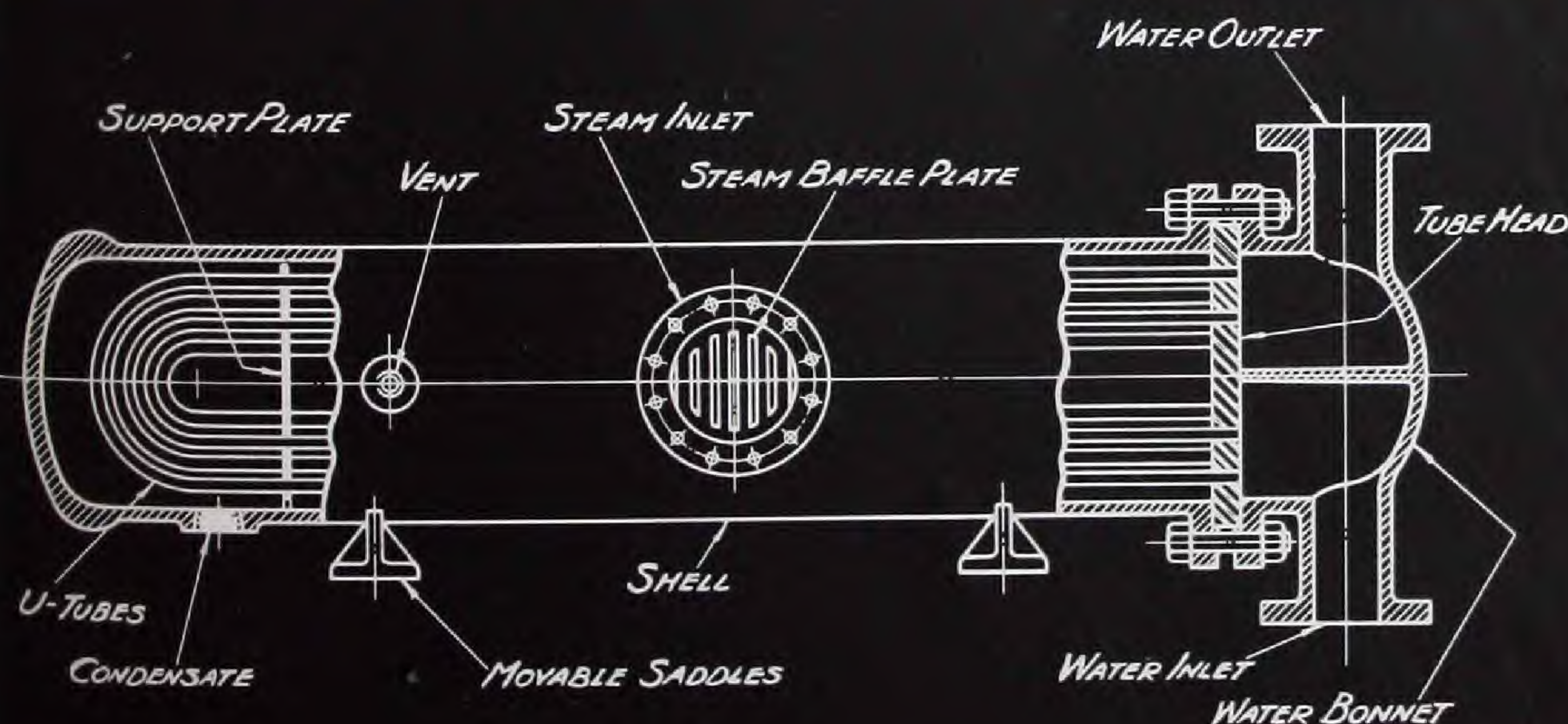
STANDARD PRESSURES

Working Pressure....	Shell and tube spaces...125 Lbs./sq. in.
Test Pressure.....	Shell and tube spaces...200 Lbs./sq. in.

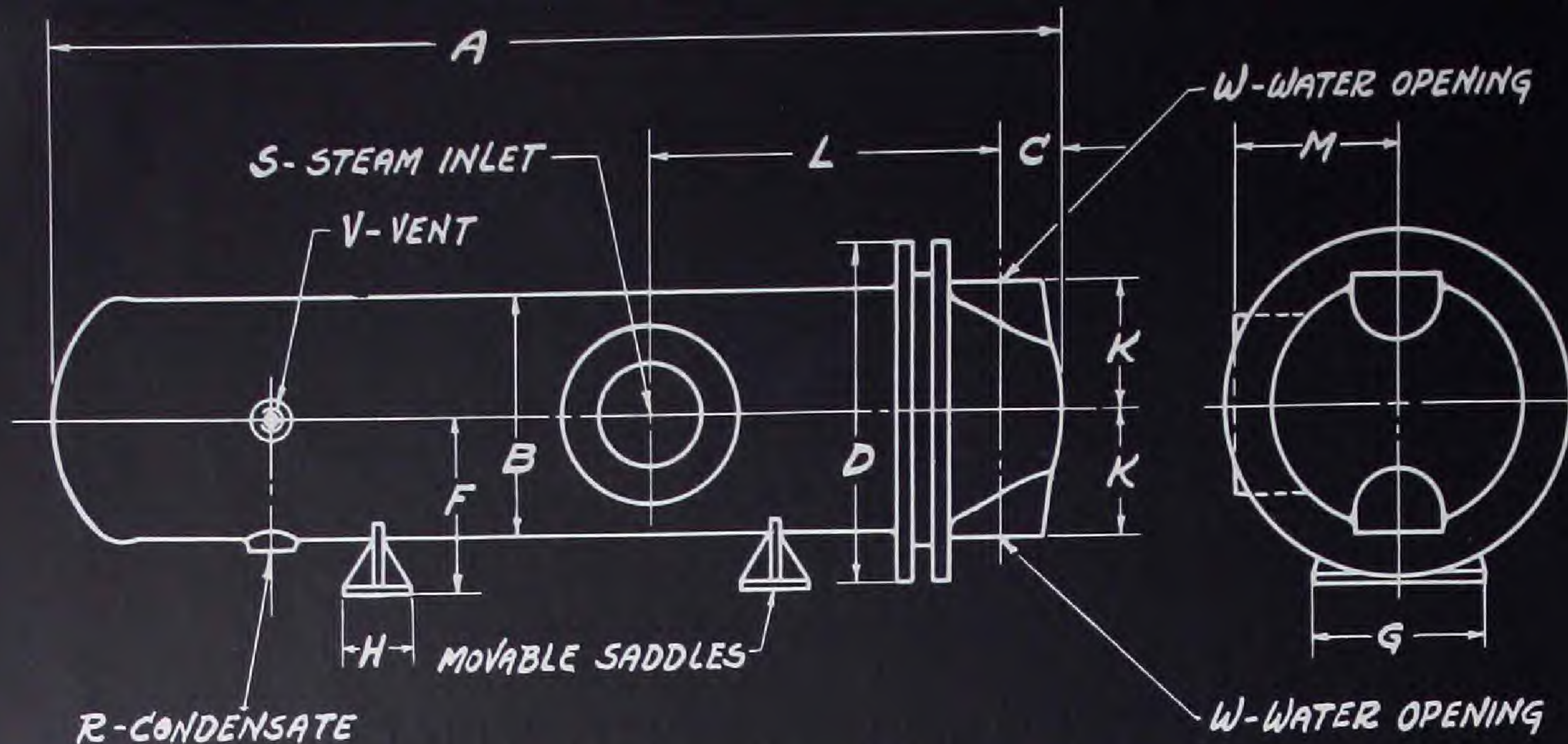
SPECIFICATIONS

SPECIFY: A $\left\{ \begin{array}{l} \text{Horizontal} \\ \text{Vertical} \end{array} \right\}$ Instantaneous Heater of the closed water tube type with a U-bend heating element made up from $\frac{3}{4}$ " O.D. #18 B.W.G. seamless drawn copper tubes. The heater shall have ample capacity to heat.....GPH of water (or other liquid) from.....° F. to.....° F. when supplied with sufficient steam at.....Lbs. Gage pressure.

The pressure loss through the tubes shall not exceedLbs./sq. in. The liquid spaces shall be designed for a working pressure of.....Lbs./sq. in., and the steam spaces for a working pressure of.....Lbs./sq. in. The heater shall be Alberger Type U or equal. Heater to be as described in the Alberger Heater Company Bulletin No. 200.



Sectional Drawing
of an Alberger In-
stantaneous Heater,
Type U.



Alberger Horizontal
Instantaneous
Heater, Type U.

FIGURE 1

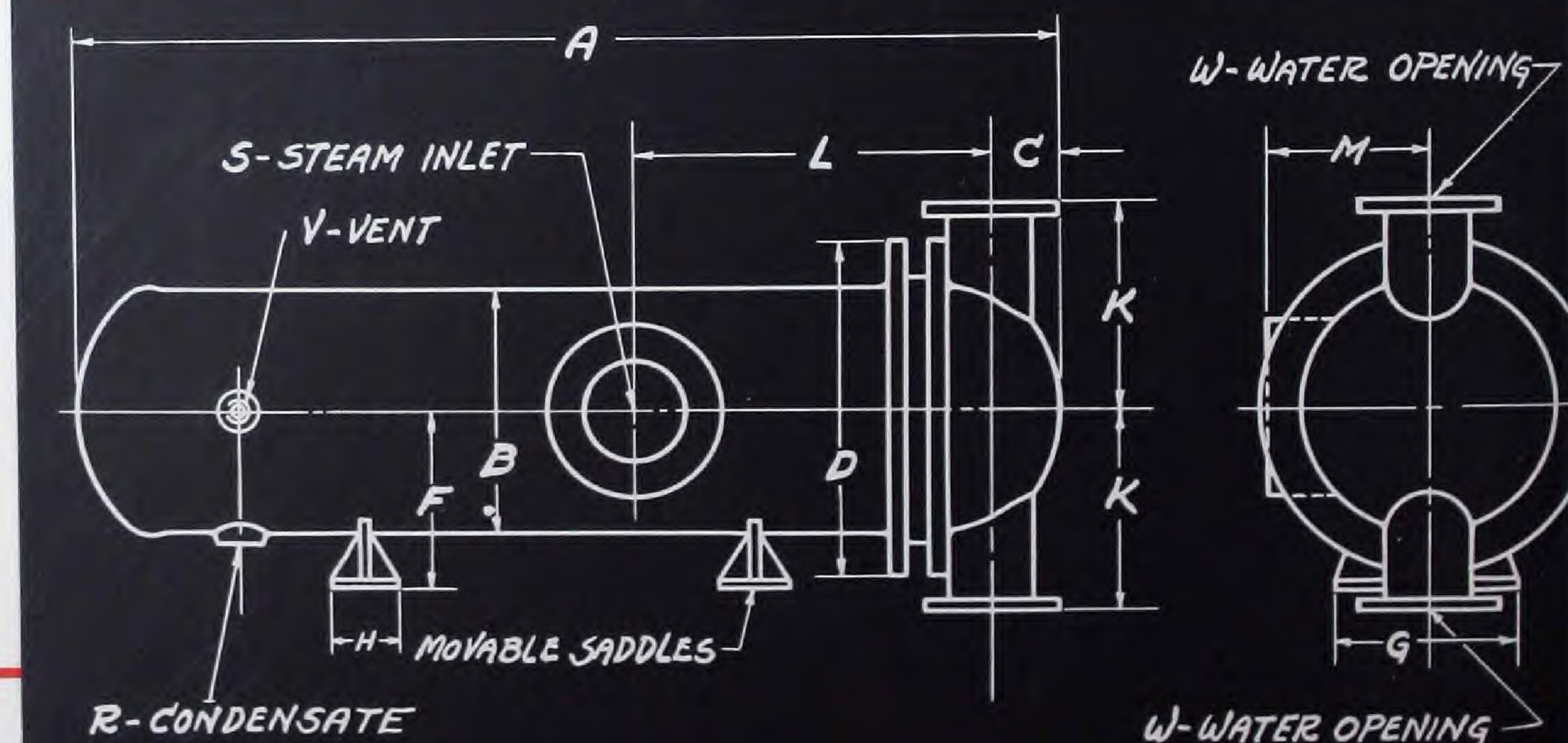
*DIMENSION TABLE — ALBERGER **TYPE U** INSTANTANEOUS HEATERS
WITH $\frac{3}{4}$ " O.D. U-BEND TUBES

Heater Size		U 5	U 5A	U 6	U 6A	U 8	U 8A	U 8B	U 10	U 10A	U 12	U 12A	U 14	U 14A	U 14B	U 16	U 16A	U 16B	U 19	U 19A	U 21	U 21A
Horizontal																						
FIGURE NO.		1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	
A		41 $\frac{1}{2}$	53 $\frac{1}{2}$	48 $\frac{1}{2}$	66 $\frac{1}{2}$	48 $\frac{1}{2}$	72 $\frac{1}{2}$	96 $\frac{1}{2}$	78 $\frac{3}{4}$	102 $\frac{3}{4}$	81 $\frac{1}{4}$	105 $\frac{1}{4}$	92 $\frac{1}{4}$	104 $\frac{1}{4}$	128 $\frac{1}{4}$	104 $\frac{3}{4}$	116 $\frac{3}{4}$	128 $\frac{3}{4}$	115 $\frac{3}{4}$	127 $\frac{3}{4}$	117 $\frac{3}{4}$	129 $\frac{3}{4}$
SHELL	B	6 $\frac{1}{8}$	6 $\frac{1}{8}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	9 $\frac{1}{4}$	9 $\frac{1}{4}$	9 $\frac{1}{4}$	11 $\frac{1}{4}$	11 $\frac{1}{4}$	13 $\frac{1}{4}$	13 $\frac{1}{4}$	15 $\frac{3}{8}$	15 $\frac{3}{8}$	15 $\frac{3}{8}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$	20 $\frac{3}{4}$	20 $\frac{3}{4}$	22 $\frac{3}{4}$	22 $\frac{3}{4}$
	B	5 $\frac{5}{8}$	5 $\frac{5}{8}$	6 $\frac{5}{8}$	6 $\frac{5}{8}$	8 $\frac{5}{8}$	8 $\frac{5}{8}$	8 $\frac{5}{8}$	10 $\frac{3}{4}$	10 $\frac{3}{4}$	12 $\frac{3}{4}$	12 $\frac{3}{4}$	15	15	15	17	17	17	20	20	22	22
Welded Steel	C	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$	4	4	5	5	5	5	5	5 $\frac{1}{2}$	5 $\frac{1}{2}$	5 $\frac{1}{2}$	5 $\frac{1}{2}$	5 $\frac{1}{2}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$
	D	9	9	10 $\frac{1}{2}$	10 $\frac{1}{2}$	12	12	12	15	15	18	18	20 $\frac{1}{2}$	20 $\frac{1}{2}$	20 $\frac{1}{2}$	23	23	23	26	26	28	28
	F	5	5	5 $\frac{3}{4}$	5 $\frac{3}{4}$	6 $\frac{1}{2}$	6 $\frac{1}{2}$	6 $\frac{1}{2}$	9	9	10	10	11	11	11	12	12	12	14 $\frac{1}{2}$	14 $\frac{1}{2}$	15 $\frac{3}{4}$	15 $\frac{3}{4}$
	G	5	5	6	6	6	6	6	8	8	10	10	12	12	12	12	12	12	14	14	14	14
	H	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3	3	3	3	3	3	3	4	4	4	4	4	5	5	5	5	5	5	5
	K	3 $\frac{1}{2}$	3 $\frac{1}{2}$	4 $\frac{1}{4}$	4 $\frac{1}{4}$	5	5	5	10	10	11	11	12 $\frac{1}{2}$	12 $\frac{1}{2}$	12 $\frac{1}{2}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	15 $\frac{1}{2}$	15 $\frac{1}{2}$	17	17
	L	13 $\frac{1}{4}$	13 $\frac{1}{4}$	13 $\frac{1}{4}$	13 $\frac{1}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$	15	15	20 $\frac{1}{2}$	20 $\frac{1}{2}$	20 $\frac{1}{2}$	20 $\frac{1}{2}$	20 $\frac{1}{2}$	23 $\frac{1}{2}$	23 $\frac{1}{2}$	23 $\frac{1}{2}$	23 $\frac{1}{2}$	23 $\frac{1}{2}$	25	25
	M	4	4	6 $\frac{1}{2}$	6 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	8	8	9	9	10 $\frac{1}{2}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$	12	12	12	13 $\frac{1}{2}$	13 $\frac{1}{2}$	14 $\frac{1}{2}$	14 $\frac{1}{2}$
OPENINGS																						
Condensate	R	1	1	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2	2	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3	3	3	3	3	3	4	4	4	4
Steam	S	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3	3	4	4	4	5	5	6	6	8	8	8	10	10	10	12	12	12	12
Vent	V	2 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$	1	1	1	1
Water	W	2	2	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3	3	4	4	4	4	4	6	6	6	6	6	8	8

* All dimensions are in inches. Flanged openings are faced and drilled 125 Lbs. American Standard.

FIGURE 2

Alberger Horizontal
Instantaneous
Heater, Type U.



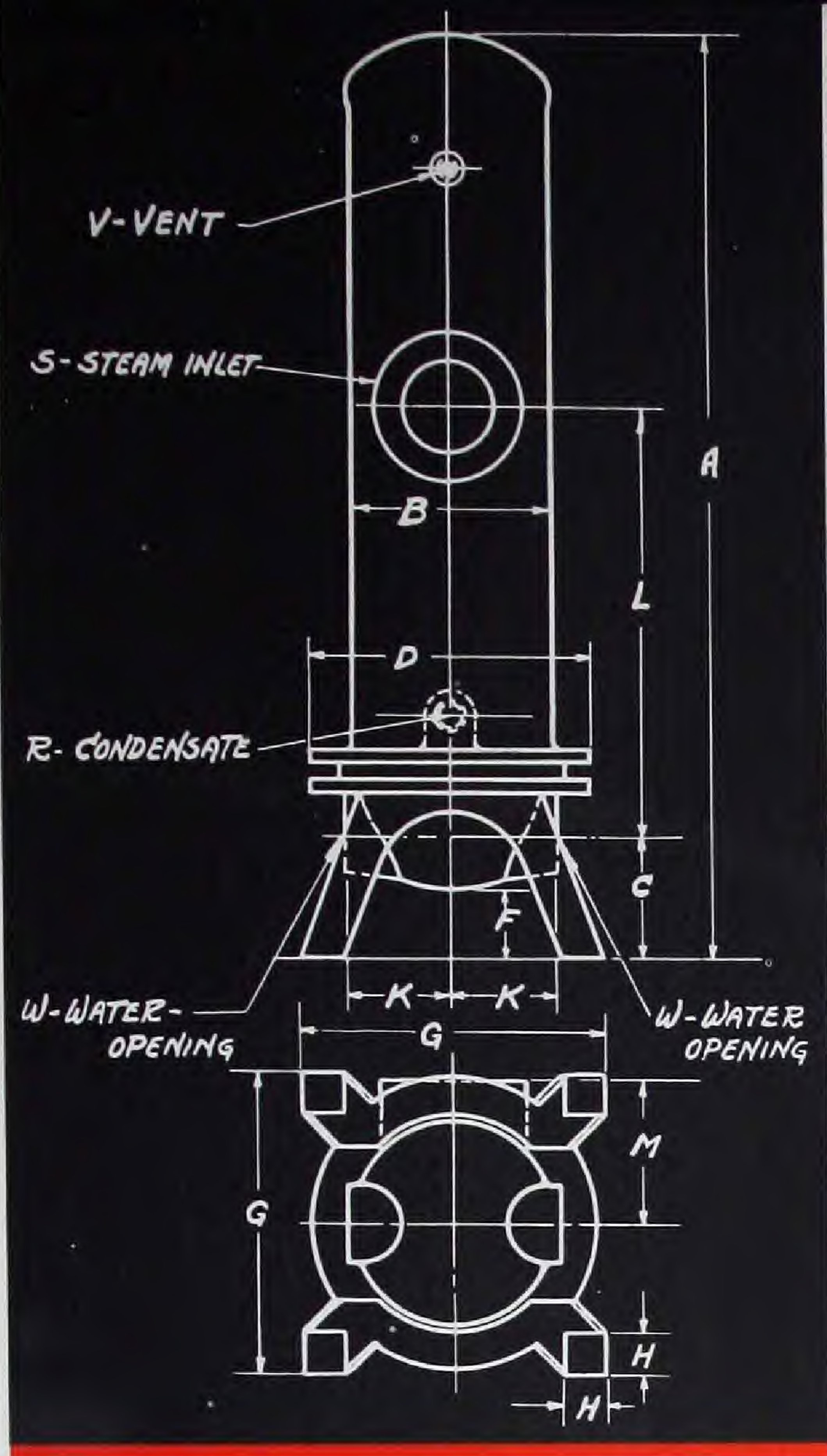


FIGURE 3

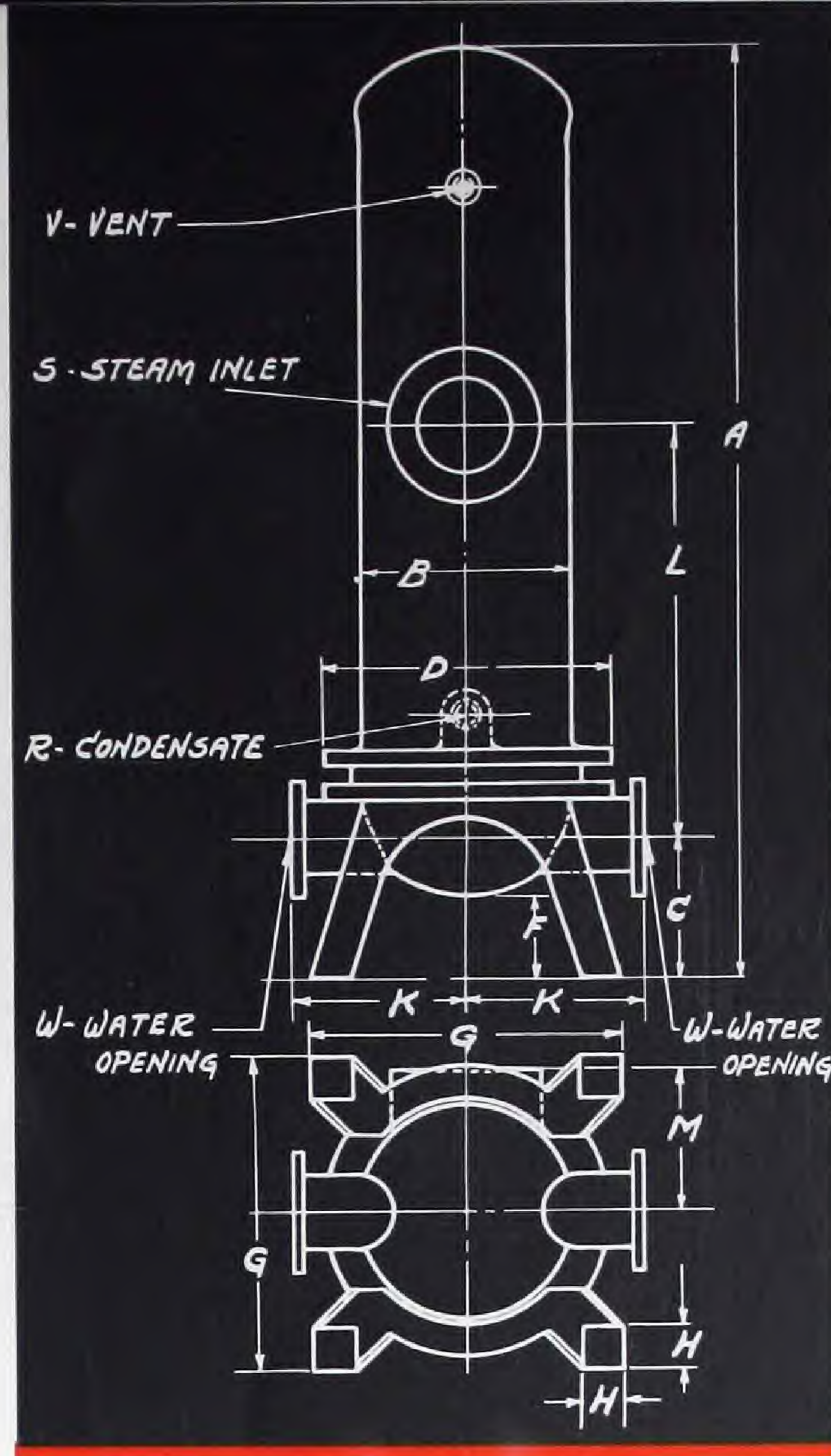


FIGURE 4

Alberger Vertical Instantaneous Heater, Type U

*DIMENSION TABLE — ALBERGER **TYPE U** INSTANTANEOUS HEATERS
WITH $\frac{3}{4}$ " O.D. U-BEND TUBES

Heater Size		U 5	U 5A	U 6	U 6A	U 8	U 8A	U 8B	U 10	U 10A	U 12	U 12A	U 14	U 14A	U 14B	U 16	U 16A	U 16B	U 19	U 19A	U 21	U 21A	
Vertical																							
FIGURE NO.		3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4		
A		45½	57½	52½	70½	52½	76½	100½	84½	108½	87	111	99½	111½	135½	112	124	136	123	135	125	137	
SHELL	Cast Iron Welded Steel	B B	6⅛	6⅛	7½	7½	9¼	9¼	9¼	11¼	11¼	13¼	13¼	15⅜	15⅜	15⅜	17½	17½	17½	20¾	20¾	22¾	22¾
			5⅝	5⅝	6⅝	6⅝	8⅝	8⅝	8⅝	10¾	10¾	12¾	12¾	15	15	15	17	17	17	20	20	22	22
	C D E F G H K L M		6¼	6¼	6¾	6¾	7¼	7¼	7¼	10¼	10¼	10¾	10¾	12	12	12	12¾	12¾	12¾	12¾	12¾	14	14
			9	9	10½	10½	12	12	12	15	15	18	18	20½	20½	20½	23	23	23	26	26	28	28
			4	4	4	4	4	4	4	5¾	5¾	5¾	5¾	7¼	7¼	7¼	7¼	7¼	7¼	7¼	7¼	7¼	7¼
			10	10	12	12	14	14	14	17	17	20	20	22	22	22	24½	24½	24½	26½	26½	29¾	29¾
			2	2	2	2	2½	2½	2½	3	3	3	3	3	3	3	3	3	3	3½	3½	3½	3½
			3½	3½	4¼	4¼	5	5	5	10	10	11	11	12½	12½	12½	13¾	13¾	13¾	15½	15½	17	17
			13¼	13¼	13¼	13¼	13¾	13¾	13¾	15	15	20½	20½	20½	20½	20½	23½	23½	23½	23½	23½	25	25
			4	4	6½	6½	7½	7½	7½	8	8	9	9	10½	10½	10½	12	12	12	13½	13½	14½	14½
OPENINGS		R S V W																					
Condensate	1		1	1¼	1¼	1½	1½	1½	2	2	2½	2½	3	3	3	3	3	3	4	4	4	4	
Steam	2½		2½	3	3	4	4	4	5	5	6	6	8	8	8	10	10	10	12	12	12	12	
Vent	1½		1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1	1	1	1
Water	2	2	2½	2½	2½	2½	2½	2½	3	3	4	4	4	4	6	6	6	6	6	6	8	8	

*All dimensions are in inches. Flanged openings are faced and drilled 125 lbs. American Standard.

HOT WATER CONVERTERS for HEATING SYSTEMS

FORCED CIRCULATION TYPE

FOR many years leading engineers have specified Alberger Heating System Heaters because of the high efficiency obtained from the use of corrugated copper tubes and correct design.

All the features of Alberger design and construction as covered under the different types of Instantaneous Heaters in the forefront of this Bulletin are embodied in the construction of Alberger Heating System Heaters or Hot Water Converters, in fact all Alberger Instantaneous Heaters are suited for this service.

The most common range through which water shall be heated in Converters is from 160°-190° F., and therefore the capacity tables of all Instantaneous Heaters show this range and give capacities in gallons per hour.

In many instances architects and engineers specify the required capacity in square feet of E.D.R. (Equivalent Direct Radiation). To find the necessary gallons of water per hour to circulate through the system at the above temperature range, use the following simple formula:

$$\text{Sq. Ft. of E.D.R.} \times .68 = \text{Gallons per hour}$$

When thus the GPH of water has been found, turn to

the capacity table of the type of Instantaneous heater desired and locate under the proper steam pressure and the 160°-190° temperature range the correct size of heater.

Example: 22,800 Sq. Ft. of E.D.R. required with
Steam available at 5 Lbs. Gage

$$22,800 \times .68 = 15,500 \text{ GPH of water required}$$

It has been decided to use a Type FC Heater with corrugated copper tubes, so it is only necessary to consult the Type FC capacity table for steam at 5 Lbs. Gage.

Follow across the page along the hot water converter range (160°-190° F.) until a 15,500 GPH capacity is reached, which will show that an FC-12-B Heater should be selected.

The maximum friction with this amount of water flowing through the heater will not exceed 8 Lbs.

If a Type FP or Type U Heater has been decided on, select the proper size heater in the same manner from the Type FP or Type U capacity tables.

For Heating System Heaters with lower friction loss or for gravity circulation, consult the nearest Alberger Representative or our Home Office.

CLOSED FEED WATER HEATERS

EVERY boiler plant should have an Alberger Closed Feed Water Heater because if cold water is fed into a boiler, additional fuel must be burned to raise its temperature to the boiling point representing a costly waste of fuel inasmuch as in practically every plant exhaust steam is available. Further, the life of the boiler is materially lengthened by injecting hot instead of cold water, as cold water upon striking the hot boiler plates will set up excessive strains due to unequal expansion of the shell.

An Alberger Closed Feed Water Heater can be selected from the Type FC, Type FP or Type U Instantaneous Heater capacity tables.

To ascertain the gallons per hour of water required for the maximum rated boiler horsepower use the following formula:

$$\text{GPH} = \text{B.H.P.} \times 3.6$$

Next, determine the minimum temperature of the mixture of make up water and returns which will be the inlet water temperature at the heater. For economical

heater size the water outlet temperature should be kept approximately 15° to 20° below the temperature of the available steam.

Example:

Required a Feed Water Heater for a boiler with a maximum rating of 1200 B.H.P.

Exhaust steam is available at 2 Lbs. Gage pressure
(= 218° F.)

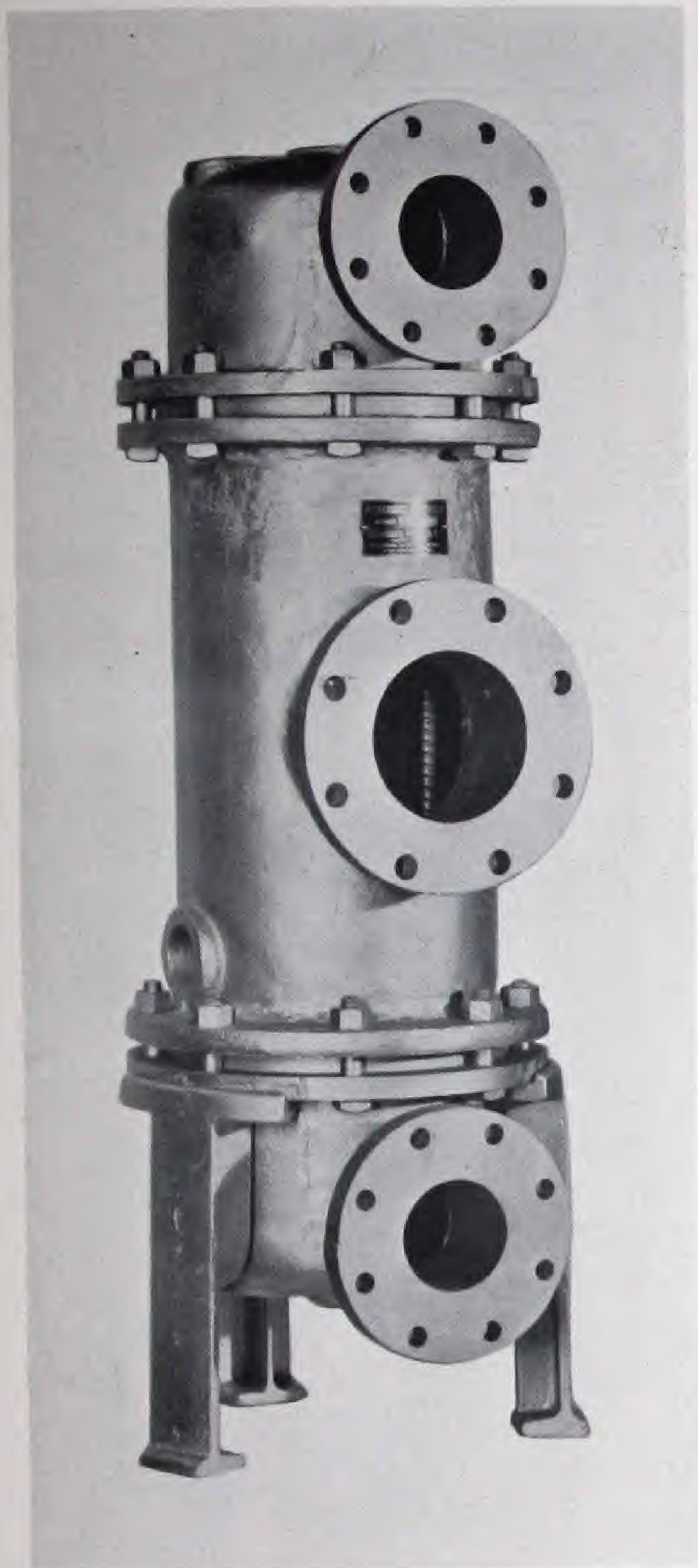
The winter temperature of returns and make up water is 100° F., and the mixture should reach the boiler at 200° F.

Amount of Feed water required

$$1200 \times 3.6 = 4330 \text{ GPH}$$

If a Type FC Heater is desired, turn to the Type FC capacity table for 2 Lb. steam pressure and follow across the page at a temperature range 100°-200° until a figure is reached corresponding to the required capacity. The nearest to this amount would be 4350 GPH; therefore, an FC-12-B Heater should be selected.

Alberger TYPE AB INSTANTANEOUS HEATERS for HUMIDIFIER and SWIMMING POOL SERVICE



Alberger Instantaneous
Heater, Type AB.

TO meet the requirements involved in air conditioning, Alberger designed the Type AB Heater, a compact unit of simple design, to heat large quantities of water through small temperature ranges. Proven ideal for such conditions, it is used as standard by virtually all the leading manufacturers of air conditioning equipment.

The Alberger Type AB Heater gained equal popularity in swimming pool service which also requires the moderate heating of large quantities of water. Single pass construction to permit the handling of large quantities with minimum frictional resistance, corrugated copper tubes to obtain the highest possible heat transmission and to absorb the small amount of thermal expansion and contraction, cast iron shell and water bonnets to minimize corrosion are the principal design features that have earned for the Alberger Type AB Heater its outstanding position.

STANDARD MATERIALS

Shell.....	Cast Iron
Bonnets.....	Cast Iron
Tube Sheets.....	Forged Steel
Saddles or Legs.....	Cast Iron
Tubes.....	$\frac{3}{4}$ " O.D. Seamless Drawn Corrugated Copper

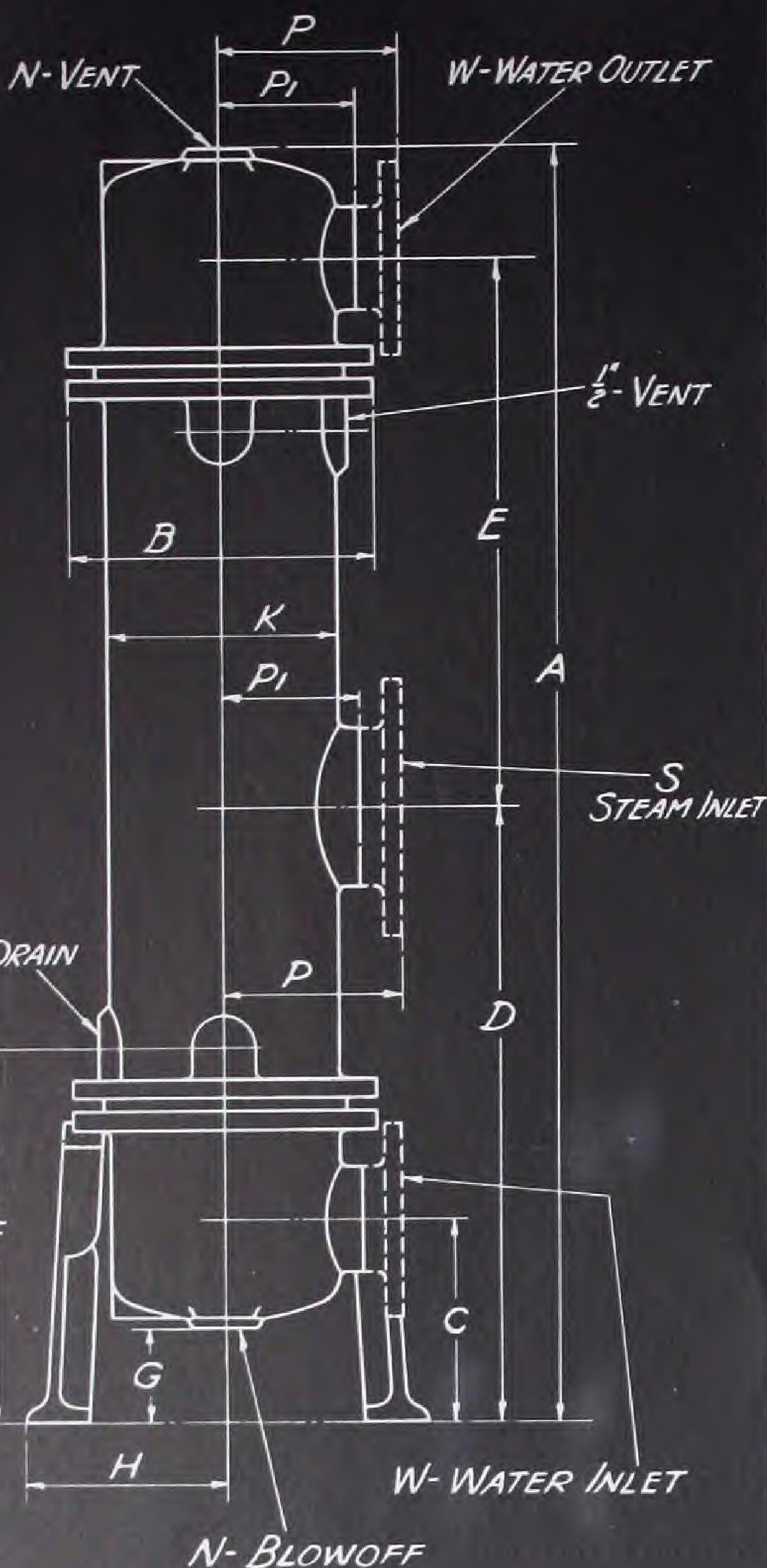
STANDARD PRESSURES

Working Pressure.....	Shell and tube spaces.....	100 Lbs./Sq. In.
Test Pressure.....	Shell and tube spaces.....	150 Lbs./Sq. In.

SPECIFICATION

SPECIFY: A $\left\{ \begin{array}{l} \text{Horizontal} \\ \text{Vertical} \end{array} \right\}$ Instantaneous Heater of the closed water-tube type. It shall be single pass construction and equipped with $\frac{3}{4}$ " O.D. seamless drawn corrugated copper tubes. The heater shall have ample capacity to heat ... G.P.H. of water from ...° F. to ...° F., when supplied with sufficient steam at ... Lbs. gage pressure.

The pressure loss through the tubes shall not exceed ... Lbs./Sq. In. The water spaces shall be designed for a working pressure of ... Lbs./Sq. In., and the steam spaces for a working pressure of ... Lbs./Sq. In. The Heater shall be Alberger Type AB or equal. Heater to be as described in the Alberger Heater Company Bulletin No. 200.



Dimensional Drawing of
an Alberger Instantane-
ous Heater, Type AB.

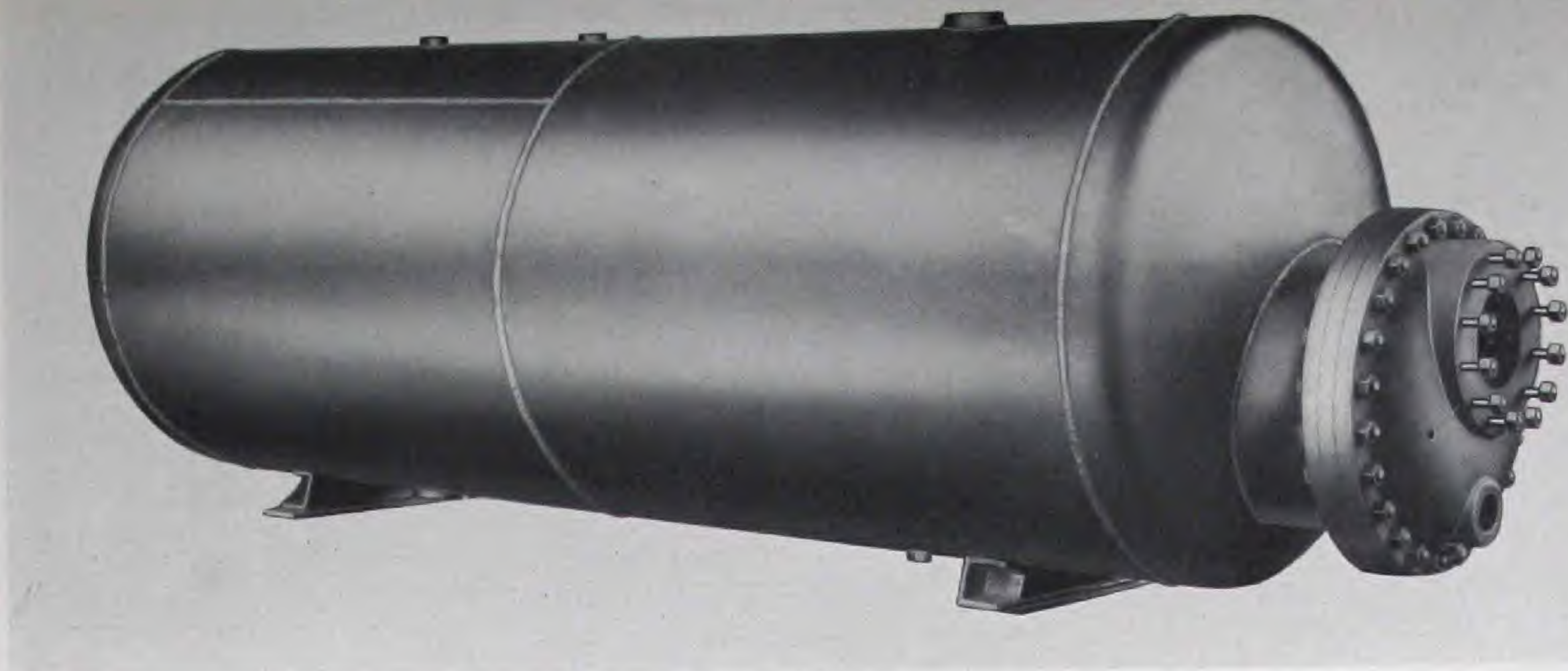
SWIMMING POOL CAPACITY TABLES ALBERGER TYPE AB INSTANTANEOUS HEATERS WITH CORRUGATED TUBES			
Temperature Range 40° to 80°F. Maximum Friction 3 Lbs./sq. in.			
G.P.H. Water	STEAM PRESSURES		
	0 to 2 Lbs. Gage	5 to 8 Lbs. Gage	10 to 15 Lbs. Gage
	HEATER SIZES		
1800	4½— 6	4½— 6	4½— 6
2000	4½— 8	4½— 6	4½— 6
2500	4½—10	4½— 8	4½— 8
3200	6 —12	4½—10	4½—10
3800	6 —14	6 —12	4½—10
5000	6 —18	6 —16	6 —14
6000	6 —20	6 —18	6 —16
6500	6 —22	6 —20	6 —18
7000	8 —24	6 —22	6 —20
8000	8 —27	8 —24	6 —22
9000	8 —30	8 —27	8 —24
10000	8 —33	8 —30	8 —27
11000	8 —37	8 —33	8 —30
12000	10 —40	8 —37	8 —33
13000	10 —43	10 —39	8 —37
14000	10 —48	10 —43	10 —39
15000	10 —50	10 —45	10 —40
16000	10 —53	10 —48	10 —43
17000	10 —57	10 —51	10 —46
18000	10 —60	10 —54	10 —48
20000	10 —67	10 —60	10 —54
22000	10 —74	10 —66	10 —59
24000	10 —80	10 —72	10 —64

The first figure in the heater size indicates the diameter of the shell in inches and the second figure the number of tubes. Dimensions for the various shell diameters are listed in the dimension table below.

*DIMENSION TABLE—ALBERGER TYPE AB INSTANTANEOUS HEATERS WITH CORRUGATED TUBES							
SHELL SIZES		4½	6	8	10	12	14
	A	62½	62¾	68	71	71¾	76¾
	B	8⅝	10	12	15	18	20½
	C	6	5½	8	8¾	8½	9½
	D	20⅞	20⅞	23⅞	26	25⅞	27⅞
	E	38⅞	39⅞	39⅞	41¼	41⅜	42⅜
	F	11⅞	11⅝	15½	17½	18⅞	20⅞
	G	3¼	3	3¾	5	4	3
	H	6⅞	6½	7⅞	9	11	12
	K	5⅞	7	9	11¼	13¼	15⅝
	TAPPED OPENINGS						
Condensate Drain	L N P S W	1	1	2	2	2½	2½
Blowoff and Vent		½	¾	1	1	1	1
Steam		3¼	4¼	.....	.....	.....	.....
Water		2½	3	.....	.....	.....	.....
	W	2	2½	.....	.....	.....	.....
FLANGED OPENINGS							
	P S W	.....	.....	7	8⅞	11½	13
Steam		.....	.....	5	6	8	8
Water		.....	.....	3	4	5	6

* All dimensions are in inches. Flanged openings F. & D. 125 Lbs. American Standard.

Alberger
Horizontal Storage
Heater, Type S. Welded
Construction.



Alberger TYPE S STORAGE HEATERS

WHERE large quantities of hot water are withdrawn at irregular intervals, hot water storage heaters render the most economical and satisfactory service. Water is heated at a uniform rate and stored during periods of low demand for use at peak requirements, thereby preventing overloads on the steam supply. The constant flow of steam into the heating element assures maximum heat recovery from exhaust steam which, if used for instantaneous heating, would be partially wasted by discharge into the atmosphere during periods of low demand.

Meeting the most exacting demands in construction and quality of workmanship and materials, Alberger Storage Heaters have gained a wide acceptance among architects, engineers and owners. Some of the original Alberger Storage Heaters still perform efficiently in continuous service.

The Alberger Standard Type S Storage Heater consists of a welded or riveted steel plate tank and a removable U-bend heating element. All tanks are carefully designed for maximum strength with suitable plate thicknesses for various working pressures as shown in the table on page 29. Capable and qualified welders who periodically submit test plates for A.S.M.E. approval fabricate Alberger welded storage tanks. Riveted tanks are built in accordance with the best boiler making practice with rivets of proper size and spacing. Longitudinal seams are either double or triple riveted and designed for proper joint efficiency. Tanks 24" in diameter and larger are provided with man-holes, smaller tanks with handholes.

The heating element is composed of a group of $1\frac{1}{4}$ " O.D. No. 17 B.W.G. seamless drawn copper tubes formed into U-bends and each end expanded into a forged steel tube sheet. Alberger U-bends are formed by drawing each tube over a mandrel while bending; a method that assures full wall thickness and area in the bend. A rigid support plate holds them firmly in position and prevents vibration. The steam bonnet of cast iron construction is bolted to the tube sheet and tank nozzle.

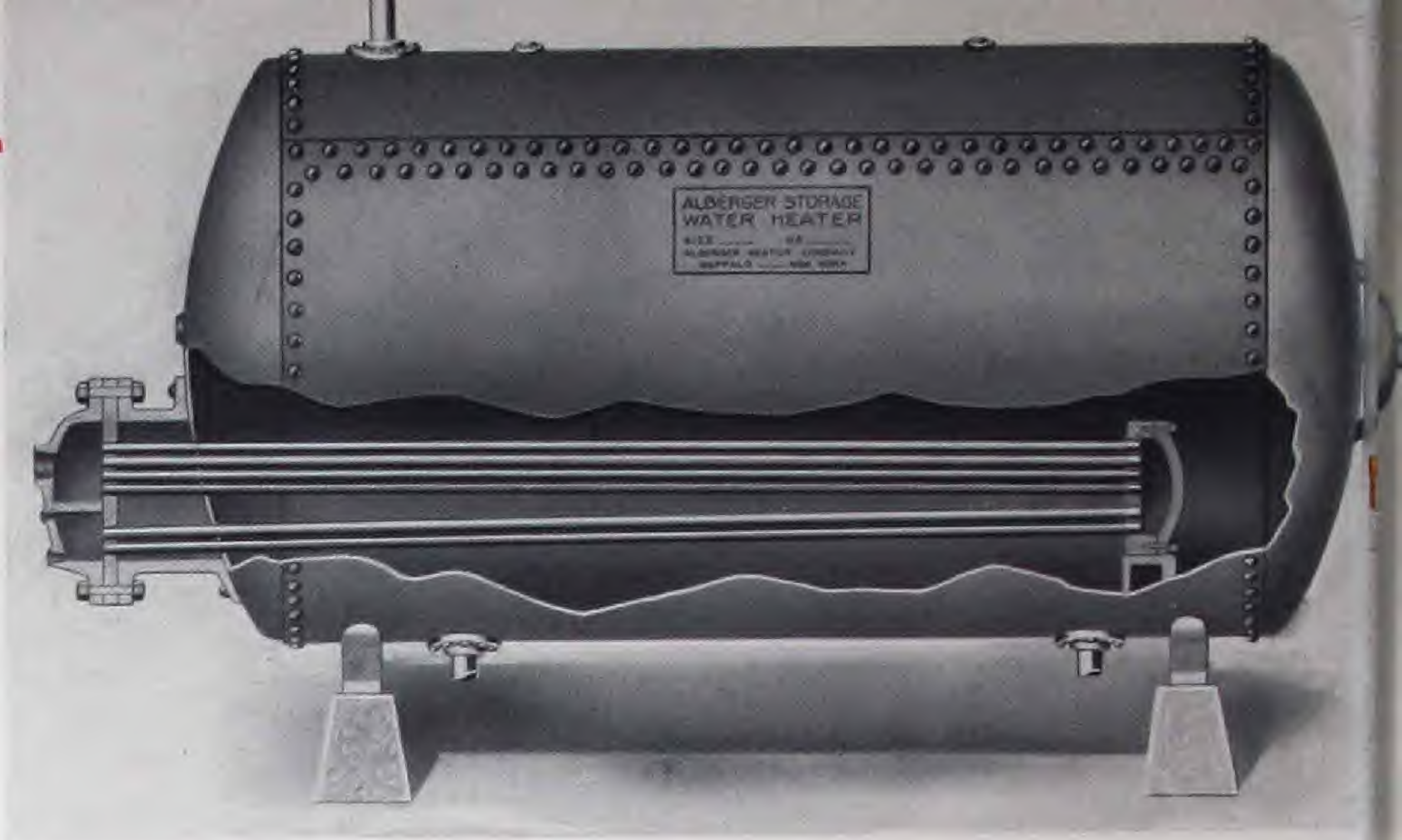
Steam and water spaces are subjected to a hydrostatic test pressure 50% in excess of their respective working pressure.

The following data and tables permit quick and accurate selections of Alberger Standard Type S Storage Heaters. They are also essentially applicable for special construction.

Alberger
Vertical Storage Heater, Welded Con-
struction.



**Alberger Horizontal Storage Heater
with Floating Head Type Heating
Element. Riveted Construction.**



THE Alberger Standard Type S Storage Heater is ideally suited for the great majority of applications, however, various special conditions such as local code requirements, extremely high pressures, local water conditions and corrosive liquids often require special construction.

Alberger builds storage type heaters to suit any such conditions and has the experience and facilities not only to manufacture to the rigid specifications of the ASME Code for Unfired Pressure Vessels, but also to build storage heaters with tanks and other parts fabricated of such corrosion resisting materials as: COPPER-SILICON ALLOY, MONEL METAL, STAINLESS STEEL, NICKEL-CLAD STEEL, STAINLESS-CLAD STEEL, COPPER BEARING STEEL, GALVANIZED STEEL, ETC.

STANDARD MATERIAL

Tank	Welded or riveted steel plate construction
Steam Bonnet	Cast Iron
Saddles	Cast Iron
Tube Sheet	Forged Steel
Tube Support Plate	Forged Steel
Tubes	1¼" O.D. No. 17 B.W.G. Seamless drawn Copper

STANDARD PRESSURES

Element—100 Lbs./Sq. In. Working Pressure . . . 150 Lbs./Sq.
In. Test Pressure.

Tank—For working pressure, see table page 29.
Test Pressure—50% in excess of working pressure.

Alberger also builds floating head type heating elements with straight tubes arranged in two passes. The first pass comprising two thirds of the total number of tubes presents a large area for the flow of the full volume of steam, the second pass carries a smaller volume and returns the condensate.

Where it is necessary to heat the water with two separate heating mediums, two elements can be installed to operate independently without the danger of contaminating one medium with the other.

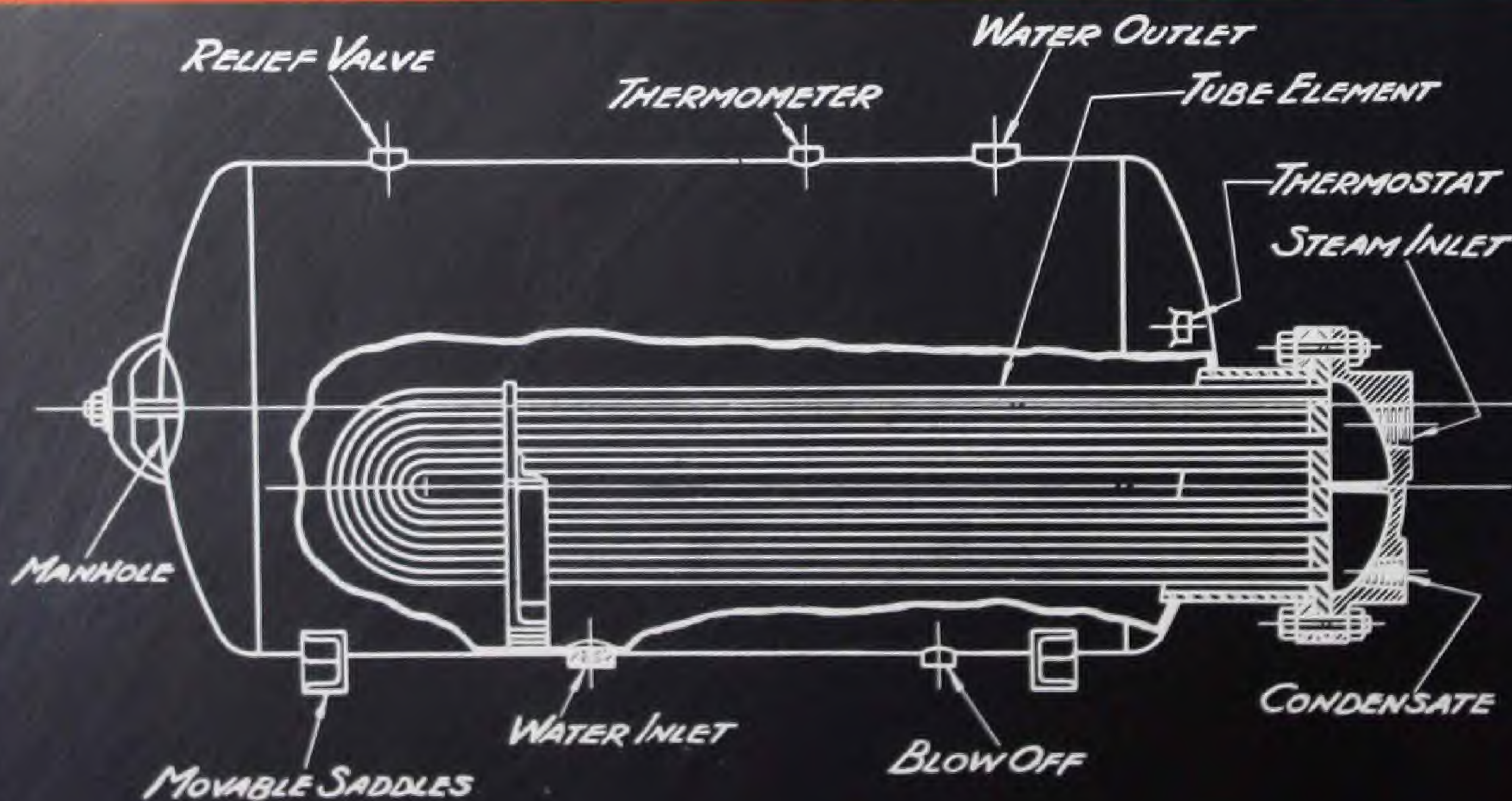
Vertical Storage Heaters with specially designed heating elements can be furnished where available floor space for installation is limited.

SPECIFICATIONS

SPECIFY: A $\left\{ \begin{array}{l} \text{Horizontal} \\ \text{Vertical} \end{array} \right\}$ Storage Heater having a $\left\{ \begin{array}{l} \text{welded} \\ \text{riveted} \end{array} \right\}$ steel Tank....." diameter x....." long with a storage capacity of.....gallons and designed for a working pressure of.....Lbs. per square inch.

The heating element shall have ample capacity to heat GPH of water from° F. to° F., when supplied with sufficient steam at Lbs. gage pressure. The element shall be built for a working pressure of Lbs. per square inch and shall contain square feet heating surface made up from 1¼" O.D. No. 17 B.W.G. seamless drawn copper tubes in the form of U-bends.

The heater shall be Alberger Type S or equal. Heater to be as described in the Alberger Heater Company Bulletin No. 200.



Sectional Drawing of Alberger Horizontal Storage Heater, Type S.

HOT WATER REQUIREMENTS FOR VARIOUS BUILDINGS

MAXIMUM GALLONS OF HOT WATER PER FIXTURE PER HOUR													
FIXTURES	Apartment House	Club	Gymnasium	Hospital	Hotel	Industrial Plant	Laundry	Office Bldg.	Public Bath	Private Residence	School	Y. M. C. A.	Department Store
Wash Basin (Private)	3	3	3	3	3	3	3	3	3	3	3	3	3
Wash Basin (Public)	5	8	10	8	10	15	10	8	15	..	18	10	8
Bath Tubs	15	15	30	15	20	30	...	..	45	15	...	30	...
Foot Basins	3	3	12	3	3	12	...	..	...	3	3	12	...
Kitchen Sink	10	20	...	20	20	20	...	..	...	10	10	20	...
Laundry Stat. Tubs	25	35	...	35	35	...	42	..	...	25	...	35	...
Laundry Revol. Tubs	75	75	...	100	150	...	100 to 200	..	100	75	...	100	...
Pantry Sinks	10	20	...	20	20	...	...	..	...	10	20	20	...
Showers	75	200	200	100	100	200	...	..	200	75	200	200	100
Slop Sinks	20	20	...	20	30	20	10	15	15	15	20	20	20
Heating cap. in % of maximum demand	30%	50%	80%	50%	50%	50%	100%	20%	100%	50%	25%	75%	50%
Storage cap. in % of maximum demand	100%	75%	50%	60%	60%	75%	50%	100%	50%	70%	80%	50%	75%

Dish Washers—300 Gal. per hour @ 180° for a serving capacity of 500 people.

The quantities shown in the above table are gallons per hour of hot water at 180° F., for which a possible maximum demand may exist for various fixtures and the last two lines indicate the percentage of the total possible maximum demand for which heating and tank storage capacities should be provided for particular buildings.

TYPICAL EXAMPLE outlining the method to arrive at the correct size Alberger Type S Storage Heater. Assume that a Hospital has the following fixtures:

100 Wash Basing (private)	×	3 GPH	= 300
10 Wash Basins (public)	×	8 GPH	= 80
20 Bath Tubs	×	15 GPH	= 300
10 Foot Basins	×	3 GPH	= 30
2 Kitchen Sinks	×	20 GPH	= 40
4 Revol. Laundry Tubs	×	100 GPH	= 400
4 Pantry Sinks	×	20 GPH	= 80
4 Showers	×	100 GPH	= 400
10 Slop Sinks	×	20 GPH	= 200

1830 Gal.—Maximum hourly demand

Hourly heating capacity.....50% of 1830 = 915 Gal. per hour.
 Tank-storage capacity.....60% of 1830 = 1100 Gals.

SUMMARY: The tank should have a storage capacity of 1100 Gallons and the heating element a capacity to heat 915 GPH of water from 40° to 180° F. Assume that exhaust steam is available at atmospheric pressure (212° F.)

From conversion table page 28, the conversion factor is 20.

$$\frac{915 \text{ GPH}}{20} = 45.7 \text{ Sq. Ft. of heating surface}$$

The table at the bottom of page 28 shows the nearest shell size to 1100 Gallons is No. 19 (48" x 144") with 1140 Gallons storage. Continue across the Horizontal line (pages 28 and 29) for this size of tank until the required heating surface is met. The "B" element with 6 tubes has 46 Sq. Ft. of surface.

Select a No. 19 tank with a No. B-6 element.

SPECIFY an Alberger Type S storage heater, size 19-B-6. Tank to be designed for a working pressure of Lbs./Sq. In. (welded or riveted) steel construction. Shell thickness..... Head thickness.....

See table at top of page 29 for proper shell and head thicknesses.

CONVERSION TABLE — FOR **TYPE S** STORAGE HEATERS

Gallons Water Heated Per Hour Per Sq. Ft. Heating Surface

Temp. Range ° F.	Atmos. 212° F.	Steam Pressure—Lbs. Gage									
		1	2	5	10	15	20	25	30	40	50
40-140	38.5	39.7	40.8	44	51.5	55	58.3	61.5	64.3	68.9	72.9
150	33	34	35	37.8	44.5	48.1	51	53.9	56.6	60.7	64.3
160	28	29	30	32.8	39	42.1	44.8	47.3	50.2	53.9	57.2
170	24	24.8	25.7	28.3	34	37	39.5	42	44.4	48	51.1
180	20	20.9	21.8	24.4	29.6	32.5	35	37.2	39.5	42.8	45.6
50-140	41.5	42.6	43.9	47.5	55.5	60	63.2	66.7	70.2	75	79.5
150	35	36	37.2	40.3	47.8	51.5	54.8	57.9	60.7	65.4	69.4
160	29.5	30.5	31.6	34.6	41.2	45.5	47.7	50.5	53.3	57.5	61.2
170	25	25.9	26.8	29.7	35.7	38.9	41.7	44.4	46.9	50.6	54.1
180	20.7	21.7	22.6	25.4	31	34	36.7	39.1	41.5	44.9	48.2
60-140	45	46.2	47.7	51.5	60.5	65	69.5	73.3	76.5	82.2	87.4
150	37.5	38.8	39.8	43.4	51.5	55.5	59.3	62.8	65.7	70.8	75.5
160	31.4	32.4	33.4	36.8	44	47.5	51.3	54.2	57.1	61.5	65.7
170	26.2	27.2	28.2	31.3	37.6	41.3	44.4	47.2	49.9	54	57.8
180	21.6	22.6	23.6	26.6	32.4	35.7	38.5	41.3	43.7	47.5	51.1
70-140	49.5	51	52.4	57	66.8	72.1	77	81.2	85.5	91.8	97.5
150	40.5	41.9	43.1	47.2	56	60.5	65	68.5	72.3	77.6	82.6
160	33.4	34.6	35.9	39.4	47.2	51.5	55	58.5	61.8	66.8	71
170	27.6	28.8	29.9	33.2	40	44	47.2	50.5	53.5	57.9	61.8
180	22.5	23.6	24.7	27.9	34.2	37.6	40.8	43.7	46.5	50.5	54.3

The figures in the above conversion table represent gallons of water per hour heated by one square foot surface through a desired temperature range at different steam pressures. The necessary square feet of heating surface can be found by dividing the desired gallons per hour of hot water by the

conversion factor. This method represents an easy way to quickly determine the correct amount of heating surface in storage heaters. See example on page 27. The Table below shows the heating surface in various sizes of heaters.

Tank			HEATING SURFACE IN ALBERGER																			
			SQUARE FEET OF SURFACE AND NUMBER																			
			'A' Element					'B' Element					'C' Elem.		'D' Element							
Size in Inches	Code Size	Gallons Storage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
24 x 60	1	118	3	6	10	12	16	19	22	25	27	30	34	36	40	43	46	49	51	53	56	58
24 x 72	2	141	4	8	11	15	19	23	27	30	33	37	41	44	49	52	56	59	63	65	68	71
30 x 72	3	220	4	8	11	15	19	23	27	30	33	37	41	44	49	52	56	59	63	65	68	71
30 x 84	4	255	5	9	13	18	22	27	31	35	39	43	48	52	57	61	65	70	73	76	81	84
30 x 96	5	290	6	10	15	20	25	31	36	41	45	50	55	60	66	70	75	80	85	88	93	97
36 x 72	6	315	4	8	11	15	19	23	27	30	33	37	41	44	49	52	56	59	63	65	68	71
36 x 84	7	365	5	9	13	18	22	27	31	35	39	43	48	52	57	61	65	70	73	76	81	84
36 x 96	8	420	6	10	15	20	25	31	36	41	45	50	55	60	66	70	75	80	85	88	93	97
36 x 108	9	475	7	12	17	23	29	35	40	46	50	56	62	68	74	80	85	90	96	100	105	110
36 x 120	10	525	7	13	19	26	32	38	45	51	56	63	70	76	83	89	95	101	107	111	118	123
42 x 84	11	500	5	9	13	18	22	27	31	35	39	43	48	52	57	61	65	70	73	76	81	84
42 x 96	12	575	6	10	15	20	25	31	36	41	45	50	55	60	66	70	75	80	85	88	93	97
42 x 108	13	650	7	12	17	23	29	35	40	46	50	56	62	68	74	80	85	90	96	100	105	110
42 x 120	14	720	7	13	19	26	32	38	45	51	56	63	70	76	83	89	95	101	107	111	118	123
42 x 144	15	860	8	16	23	31	38	46	54	62	68	76	84	91	100	107	114	122	129	135	143	150
48 x 96	16	750	6	10	15	20	25	31	36	41	45	50	55	60	66	70	75	80	85	88	93	97
48 x 108	17	845	7	12	17	23	29	35	40	46	50	56	62	68	74	80	85	90	96	100	105	110
48 x 120	18	950	7	13	19	26	32	38	45	51	56	63	70	76	83	89	95	101	107	111	118	123
48 x 144	19	1140	8	16	23	31	38	46	54	62	68	76	84	91	100	107	114	122	129	135	143	150
48 x 168	20	1310	8	16	23	31	38	46	54	62	68	76	84	91	100	107	114	122	129	135	143	150
54 x 120	21	1190	7	13	19	26	32	38	45	51	56	63	70	76	83	89	95	101	107	111	118	123
54 x 144	22	1430	8	16	23	31	38	46	54	62	68	76	84	91	100	107	114	122	129	135	143	150
60 x 120	23	1420	7	13	19	26	32	38	45	51	56	63	70	76	83	89	95	101	107	111	118	123
60 x 144	24	1710	8	16	23	31	38	46	54	62	68	76	84	91	100	107	114	122	129	135	143	150
60 x 168	25	2000	8	16	23	31	38	46	54	62	68	76	84	91	100	107	114	122	129	135	143	150

***TANK THICKNESSES RECOMMENDED FOR VARIOUS WORKING PRESSURES**

Tank Dia.	100 Lbs.				125 Lbs.				150 Lbs.			
	Welded		Riveted		Welded		Riveted		Welded		Riveted	
	Shell	Heads	Shell	Heads	Shell	Heads	Shell	Heads	Shell	Heads	Shell	Heads
24"	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "
30"	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{1}{4}$ "	$\frac{3}{8}$ "	$\frac{5}{16}$ "	$\frac{3}{8}$ "
36"	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{1}{4}$ "	$\frac{3}{8}$ "	$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{5}{16}$ "	$\frac{7}{16}$ "	$\frac{3}{8}$ "	$\frac{7}{16}$ "
42"	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{5}{16}$ "	$\frac{7}{16}$ "	$\frac{3}{8}$ "	$\frac{7}{16}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "
48"	$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{7}{16}$ "	$\frac{9}{16}$ "	$\frac{7}{16}$ "	$\frac{9}{16}$ "
54"	$\frac{5}{16}$ "	$\frac{7}{16}$ "	$\frac{5}{16}$ "	$\frac{7}{16}$ "	$\frac{7}{16}$ "	$\frac{9}{16}$ "	$\frac{7}{16}$ "	$\frac{9}{16}$ "	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{7}{16}$ "	$\frac{5}{8}$ "
60"	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{7}{16}$ "	$\frac{9}{16}$ "	$\frac{1}{2}$ "	$\frac{9}{16}$ "	$\frac{9}{16}$ "	$\frac{11}{16}$ "	$\frac{1}{2}$ "	$\frac{11}{16}$ "
72"	$\frac{7}{16}$ "	$\frac{9}{16}$ "	$\frac{7}{16}$ "	$\frac{9}{16}$ "	$\frac{9}{16}$ "	$\frac{11}{16}$ "	$\frac{9}{16}$ "	$\frac{11}{16}$ "	$\frac{5}{8}$ "	$\frac{13}{16}$ "	$\frac{5}{8}$ "	$\frac{13}{16}$ "

* The above thicknesses are for steel plate construction only.

For the selection of the proper size
storage heater, see typical example page 27.

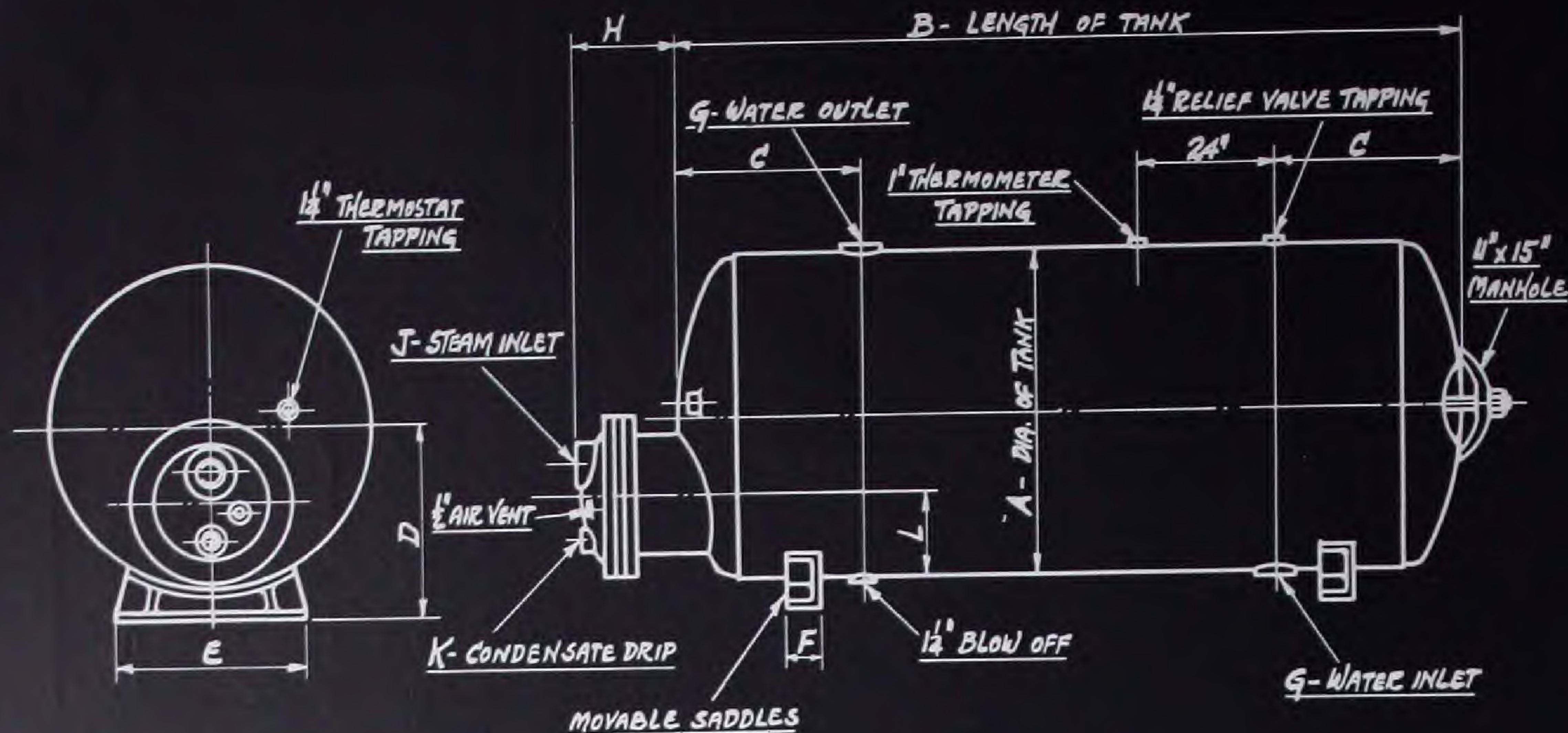
The table below on page 28 and 29 outlines storage and capacity data for Alberger Standard Storage Heaters. At the left are shown standard tank sizes with their code numbers and storage capacities. To the right of each tank size are listed the square feet of heating surfaces which can be furnished for that particular size of tank. The headings above the heating surface figures represent the element sizes and

number of tubes. For example, an Alberger Type S Storage Heater, size 15-F-30 has a tank 42" diameter x 144" long with a storage capacity of 860 gallons and is equipped with a size F Element, containing 30 tubes totaling 228 Sq. Ft. of heating surface. See page 30 for dimensions of Alberger Type S Storage Heaters.

TYPE S — U TUBE STORAGE HEATERS

OF TUBES IN THE VARIOUS ELEMENTS

'E' Element				'F' Element							'G' Element											
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
...
76	80	84	87	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
90	94	99	103	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
104	109	114	119	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
76	80	84	87	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
90	94	99	103	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
104	109	114	119	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
118	123	129	134	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
132	138	144	150	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
90	94	99	103	107	111	116	120	125	130	134	...	...	...	...	...	...	...	...	...	...	...	...
104	109	114	119	124	128	133	139	144	149	155	...	...	...	...	...	...	...	...	...	...	...	...
118	123	129	134	140	145	151	157	163	169	175	...	...	...	...	...	...	...	...	...	...	...	...
132	138	144	150	156	162	169	175	182	189	195	...	...	...	...	...	...	...	...	...	...	...	...
159	166	174	181	189	196	204	212	220	228	236	...	...	...	...	...	...	...	...	...	...	...	...
104	109	114	119	124	128	133	139	144	149	155	158	163	167	168	172	177	183	187	193	198	204	209
118	123	129	134	140	145	151	157	163	169	175	179	184	189	190	196	202	207	213	219	225	231	237
132	138	144	150	156	162	169	175	182	189	195	200	206	212	213	219	226	232	239	245	252	259	265
159	166	174	181	189	196	204	212	220	228	236	242	249	256	259	267	274	282	289	298	306	314	322
159	166	174	181	189	196	204	212	220	228	236	242	249	256	259	267	274	282	289	298	306	314	322
132	138	144	150	156	162	169	175	182	189	195	200	206	212	213	219	226	232	239	245	252	259	265
159	166	174	181	189	196	204	212	220	228	236	242	249	256	259	267	274	282	289	298	306	314	322
132	138	144	150	156	162	169	175	182	189	195	200	206	212	213	219	226	232	239	245	252	259	265
159	166	174	181	189	196	204	212	220	228	236	242	249	256	259	267	274	282	289	298	306	314	322
159	166	174	181	189	196	204	212	220	228	236	242	249	256	259	267	274	282	289	298	306	314	322



Alberger
Horizontal
Storage Heater,
Type S.

DIMENSION TABLE *Alberger* **TYPE S** STORAGE HEATERS

*TANK DIMENSIONS						
Tank		C	D	E	F	Water Open'gs G
Code Size	A x B					
1	24 x 60	12	13 ³ / ₄	10 ¹ / ₂	1 ¹ / ₂	1 ¹ / ₂
2	24 x 72	12	13 ³ / ₄	10 ¹ / ₂	1 ¹ / ₂	1 ¹ / ₂
3	30 x 72	14	17	13 ¹ / ₂	2	2
4	30 x 84	14	17	13 ¹ / ₂	2	2
5	30 x 96	14	17	13 ¹ / ₂	2	2
6	36 x 72	15	20	15 ¹ / ₂	2 ¹ / ₂	2 ¹ / ₂
7	36 x 84	15	20	15 ¹ / ₂	2 ¹ / ₂	2 ¹ / ₂
8	36 x 96	15	20	15 ¹ / ₂	2 ¹ / ₂	2 ¹ / ₂
9	36 x 108	15	20	15 ¹ / ₂	2 ¹ / ₂	2 ¹ / ₂
10	36 x 120	15	20	15 ¹ / ₂	2 ¹ / ₂	2 ¹ / ₂
11	42 x 84	16	23	18	2 ³ / ₄	3
12	42 x 96	16	23	18	2 ³ / ₄	3
13	42 x 108	16	23	18	2 ³ / ₄	3
14	42 x 120	16	23	18	2 ³ / ₄	3
15	42 x 144	16	23	18	2 ³ / ₄	3
16	48 x 96	18	26	20	3	4
17	48 x 108	18	26	20	3	4
18	48 x 120	18	26	20	3	4
19	48 x 144	18	26	20	3	4
20	48 x 168	18	26	20	3	4
21	54 x 120	20	29	23	3 ¹ / ₂	4
22	54 x 144	20	29	23	3 ¹ / ₂	4
23	60 x 120	21	32	25	3 ³ / ₄	5
24	60 x 144	21	32	25	3 ³ / ₄	5
25	60 x 168	21	32	25	3 ³ / ₄	5

*All dimensions are in inches.

The dimensions given in the above tables are for welded or riveted steel tanks and are also applicable for welded tanks of any other material.

*ELEMENT DIMENSIONS				
Size of Element	H	Steam Inlet J	Cond. Outlet K	L
A	7 ³ / ₄	1 ¹ / ₂	1	8 ¹ / ₂
B	9 ¹ / ₄	1 ¹ / ₂	1	9 ¹ / ₄
C	10	2 ¹ / ₂	1 ¹ / ₄	10 ⁷ / ₈
D	11	4	1 ¹ / ₂	12 ¹ / ₈
E	12 ³ / ₄	6	1 ¹ / ₂	13 ¹ / ₈
F	14	6	2	14
G	14 ³ / ₄	6	2	15 ¹ / ₈

*All dimensions are in inches.

For Shell and Head Thickness see page 29.

For Storage Capacity of Tank see page 28.

For Selection of proper Size of Heating Element and Tank see Typical Example on page 27.

Steam inlet openings 4" and larger are faced and drilled 125 Lbs. American Standard.

Alberger Heating
Element for Storage
Tanks.



Alberger U TUBE HEATING ELEMENTS for STORAGE TANKS

*DIMENSION AND CAPACITY TABLE

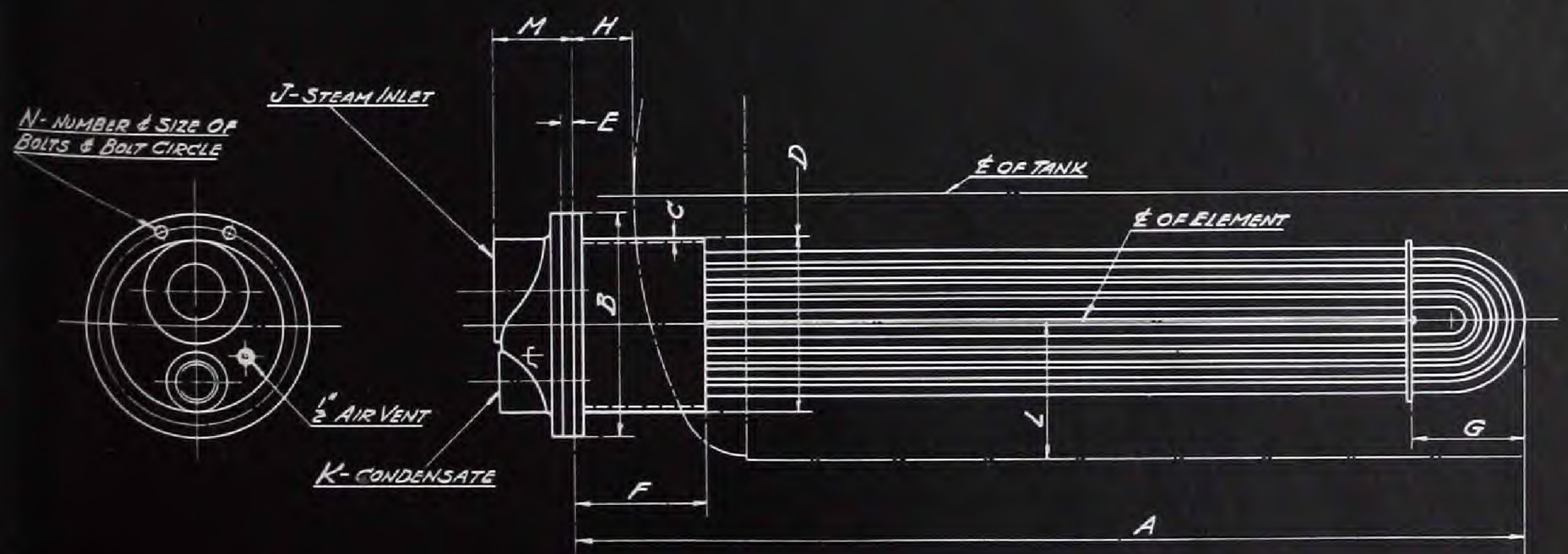
Code No.	Surface Sq. Ft.	Heating Capacity G.P.H.	A	B	C	D	E	F	G	H	J	K	L	M	N No. & Size of Bolts Bolt Circle		Min. Tank Length
AE-1	3.75	75	34	12 $\frac{1}{2}$	$\frac{5}{16}$	8	$\frac{7}{8}$	14	8	4 $\frac{1}{2}$	1 $\frac{1}{2}$	1	8 $\frac{1}{4}$	3 $\frac{1}{2}$	8- $\frac{5}{8}$	11 $\frac{1}{4}$	36"
AE-2	5	100	46	12 $\frac{1}{2}$	$\frac{5}{16}$	8	$\frac{7}{8}$	14	8	4 $\frac{1}{2}$	1 $\frac{1}{2}$	1	8 $\frac{1}{4}$	3 $\frac{1}{2}$	8- $\frac{5}{8}$	11 $\frac{1}{4}$	48"
AE-3	7.5	150	46	12 $\frac{1}{2}$	$\frac{5}{16}$	8	$\frac{7}{8}$	14	8	4 $\frac{1}{2}$	1 $\frac{1}{2}$	1	8 $\frac{1}{4}$	3 $\frac{1}{2}$	8- $\frac{5}{8}$	11 $\frac{1}{4}$	48"
AE-4	11.25	225	70	12 $\frac{1}{2}$	$\frac{5}{16}$	8	$\frac{7}{8}$	14	8	4 $\frac{1}{2}$	1 $\frac{1}{2}$	1	8 $\frac{1}{4}$	3 $\frac{1}{2}$	8- $\frac{5}{8}$	11 $\frac{1}{4}$	72"
AE-5	13.7	300	70	12 $\frac{1}{2}$	$\frac{5}{16}$	8	$\frac{7}{8}$	14	8	4 $\frac{1}{2}$	1 $\frac{1}{2}$	1	8 $\frac{1}{4}$	3 $\frac{1}{2}$	8- $\frac{5}{8}$	11 $\frac{1}{4}$	72"
AE-6	18.8	375	70	12 $\frac{1}{2}$	$\frac{5}{16}$	8	$\frac{7}{8}$	14	8	4 $\frac{1}{2}$	1 $\frac{1}{2}$	1	8 $\frac{1}{4}$	3 $\frac{1}{2}$	8- $\frac{5}{8}$	11 $\frac{1}{4}$	72"
BE-1	22.5	450	58	15	$\frac{5}{16}$	10 $\frac{1}{8}$	$\frac{7}{8}$	14	10	4 $\frac{1}{2}$	1 $\frac{1}{2}$	1	9 $\frac{1}{4}$	4 $\frac{3}{4}$	8- $\frac{3}{4}$	13 $\frac{3}{8}$	60"
BE-2	30	600	70	15	$\frac{5}{16}$	10 $\frac{1}{8}$	$\frac{7}{8}$	14	10	4 $\frac{1}{2}$	1 $\frac{1}{2}$	1	9 $\frac{1}{4}$	4 $\frac{3}{4}$	8- $\frac{3}{4}$	13 $\frac{3}{8}$	72"
BE-3	36.5	730	70	15	$\frac{5}{16}$	10 $\frac{1}{8}$	$\frac{7}{8}$	14	10	4 $\frac{1}{2}$	1 $\frac{1}{2}$	1	9 $\frac{1}{4}$	4 $\frac{3}{4}$	8- $\frac{3}{4}$	13 $\frac{3}{8}$	72"
BE-4	43	860	81 $\frac{1}{4}$	15	$\frac{5}{16}$	10 $\frac{1}{8}$	$\frac{7}{8}$	14	10	4 $\frac{1}{2}$	1 $\frac{1}{2}$	1	9 $\frac{1}{4}$	4 $\frac{3}{4}$	8- $\frac{3}{4}$	13 $\frac{3}{8}$	84"
CE-1	44.25	885	70	16 $\frac{1}{2}$	$\frac{5}{16}$	11 $\frac{1}{2}$	$\frac{7}{8}$	14	12	5 $\frac{1}{4}$	2 $\frac{1}{2}$	1 $\frac{1}{4}$	10 $\frac{7}{8}$	4 $\frac{3}{4}$	8- $\frac{3}{4}$	15	72"
DE-1	51	1020	56 $\frac{1}{2}$	18	$\frac{3}{8}$	13 $\frac{1}{4}$	$\frac{7}{8}$	14	12	5 $\frac{1}{2}$	4	1 $\frac{1}{2}$	12 $\frac{1}{8}$	5 $\frac{1}{4}$	12- $\frac{3}{4}$	16 $\frac{1}{2}$	60"
DE-2	62.5	1250	68 $\frac{1}{2}$	18	$\frac{3}{8}$	13 $\frac{1}{4}$	$\frac{7}{8}$	14	12	5 $\frac{1}{2}$	4	1 $\frac{1}{2}$	12 $\frac{1}{8}$	5 $\frac{1}{4}$	12- $\frac{3}{4}$	16 $\frac{1}{2}$	72"
DE-3	76	1520	80 $\frac{1}{2}$	18	$\frac{3}{8}$	13 $\frac{1}{4}$	$\frac{7}{8}$	14	18	5 $\frac{1}{2}$	4	1 $\frac{1}{2}$	12 $\frac{1}{8}$	5 $\frac{1}{4}$	12- $\frac{3}{4}$	16 $\frac{1}{2}$	84"
DE-4	84	1680	80 $\frac{1}{2}$	18	$\frac{3}{8}$	13 $\frac{1}{4}$	$\frac{7}{8}$	14	18	5 $\frac{1}{2}$	4	1 $\frac{1}{2}$	12 $\frac{1}{8}$	5 $\frac{1}{4}$	12- $\frac{3}{4}$	16 $\frac{1}{2}$	84"
DE-5	100	2000	92 $\frac{1}{2}$	18	$\frac{3}{8}$	13 $\frac{1}{4}$	$\frac{7}{8}$	14	18	5 $\frac{1}{2}$	4	1 $\frac{1}{2}$	12 $\frac{1}{8}$	5 $\frac{1}{4}$	12- $\frac{3}{4}$	16 $\frac{1}{2}$	96"
EE-1	120	2400	92 $\frac{1}{2}$	20 $\frac{1}{2}$	$\frac{3}{8}$	15 $\frac{1}{4}$	$\frac{7}{8}$	14	20	5 $\frac{3}{4}$	6	2	13 $\frac{3}{8}$	6 $\frac{3}{4}$	12- $\frac{7}{8}$	18 $\frac{3}{4}$	96"
FE-1	130	2600	79 $\frac{1}{2}$	23	$\frac{3}{8}$	17	1	14	20	6	6	2	14	8	16- $\frac{7}{8}$	21	84"
FE-2	150	3000	91 $\frac{1}{2}$	23	$\frac{3}{8}$	17	1	14	20	6	6	2	14	8	16- $\frac{7}{8}$	21	96"
GE-1	180	3600	73	25	$\frac{3}{8}$	19 $\frac{1}{4}$	1 $\frac{1}{8}$	14	20	6 $\frac{3}{4}$	6	2	15 $\frac{3}{8}$	8	16- $\frac{7}{8}$	23	84"
GE-2	210	4200	91	25	$\frac{3}{8}$	19 $\frac{1}{4}$	1 $\frac{1}{8}$	14	20	6 $\frac{3}{4}$	6	2	15 $\frac{3}{8}$	8	16- $\frac{7}{8}$	23	96"

*Heating capacities are for a temperature rise from 40° to 180° F. with steam at 0 Lbs. gage.
All dimensions are in inches. Flanged openings are faced and drilled 125 Lbs. American Standard.

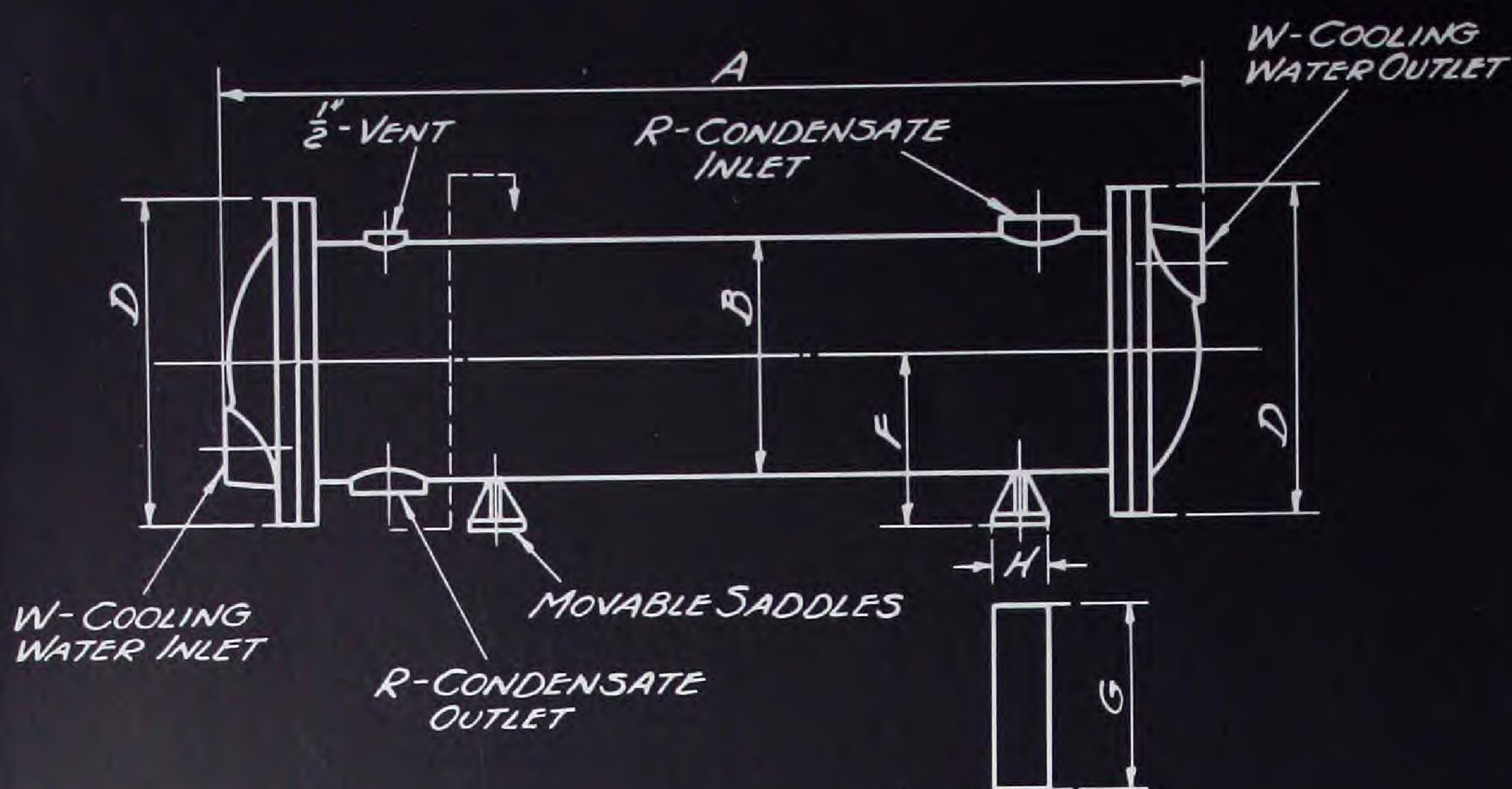
Standard Storage Tank Heating Elements for use with steel tanks are designed for a maximum working pressure of 100 Lbs. and Hydrostatically tested to 200 Lbs. before shipment. They are constructed as follows: welded steel tank nozzle, rolled steel tube sheet and support plate, cast iron steam header and 1 $\frac{1}{4}$ " O.D.

No. 17 B.W.G. seamless drawn copper tubes. For use with non-corrosive tanks, elements can be built of other material and tube gages to suit conditions. Additional capacities can be interpreted from the conversion table on page 28.

Elements can also be furnished without tank nozzle.



Dimensional Drawing for Alberger Heating Elements completely assembled and ready for installation into existing or new tanks at the proper location as shown on drawing. Note minimum length of tank in which elements can be inserted.



Alberger
Horizontal Condensate
Cooler (Economizer),
Type E.

Alberger **TYPE E**

CONDENSATE COOLERS (ECONOMIZERS) with CORRUGATED TUBES

***DIMENSION AND CAPACITY TABLE**

Condensate cooled from 200° to 100° F., with cooling water entering at 50° and leaving at 100° F.
Maximum friction in cooling water spaces — 2 Lbs./sq. in., and in the condensate spaces — 1 Ft. Head

COOLER SIZE	E-6A	E-6B	E-6C	E-8A	E-8B	E-8C	E-10B	E-10C	E-12B	E-12C	E-14C	E-14E
Cooling Water G. P. H.	265	350	415	595	790	910	1290	1480	1785	2180	2880	3750
Condensate Lbs. per Hr.	1100	1450	1740	2480	3310	3800	5370	6190	7430	9080	12000	15700
A	53	65	77	53½	65½	77½	68	80	68	80	80½	104½
B	6⅝	6⅝	6⅝	8⅝	8⅝	8⅝	10¾	10¾	12¾	12¾	14¾	14¾
D	11	11	11	12½	12½	12½	15	15	18	18	20½	20½
F	5¾	5¾	5¾	6½	6½	6½	9	9	10	10	11	11
G	6	6	6	6	6	6	8	8	10	10	12	12
H	3	3	3	3	3	3	3	3	4	4	4	4
TAPPED CONNECTIONS												
R	1¼	1¼	1¼	2	2	2	2½	2½	3	3	4	4
W	1	1	1	1½	1½	1½	2	2	2½	2½	3	3

*All dimensions are in inches.

Purchasers of steam from a central station desire to get steam at lowest cost. Cooling condensate before its return to the central station or its discharge into the sewer constitutes a definite saving as all heat extracted is transferred to some other liquid that must be heated. This saving quickly returns the small outlay involved in the installation of an Alberger Type E Condensate Cooler.

Being of fixed tube sheet construction, the Type E Condensate Cooler is equipped with corrugated copper tubes to absorb the slight expansion and contraction due to thermal differences.

Sturdy construction and quality materials assure uninterrupted service and long life.

STANDARD MATERIALS

Shell.....	Welded Steel
Bonnets.....	Cast Iron
Saddles.....	Cast Iron
Tube Sheets.....	Forged Steel
Tubes.....	¾" O.D. Seamless drawn corrugated Copper

STANDARD PRESSURES

Working Pressure...	Shell and tube spaces...	125 Lbs./sq. in.
Test Pressure.....	Shell and tube spaces...	200 Lbs./sq. in.

Alberger Tank
Suction Heater



Alberger FUEL OIL and TANK SUCTION HEATERS

FUEL Oil Heaters are for the purpose of preheating heavy oils to a temperature necessary for thorough atomization.

In Alberger Fuel Oil Heaters, oil multi-passed through the tubes is heated by steam induced into the shell. Alberger offers two types, the floating head and U-bend construction. Each design eliminates severe expansion or contraction strains due to high temperature differences. The floating head type facilitates quick cleaning of the tubes.

Alberger Fuel Oil Heaters are furnished with welded steel shells, seamless drawn steel tubes expanded into forged steel tube sheets and cast iron or steel covers. For special requirements Admiralty tubes and brass tube sheets can be supplied.

Capacities and dimensions upon application.

TANK Suction Heaters are installed in storage tanks for the purpose of heating the viscous liquid withdrawn to a temperature at which it can be easily pumped through a pipe line.

The shell of the Alberger Tank Suction Heater is inserted into the storage tank, near the bottom, and welded to the tank wall with the liquid nozzle outside the tank. This nozzle is connected to a pump which pulls the heavy liquid through the heater shell while steam inside the tubes supplies the heat.

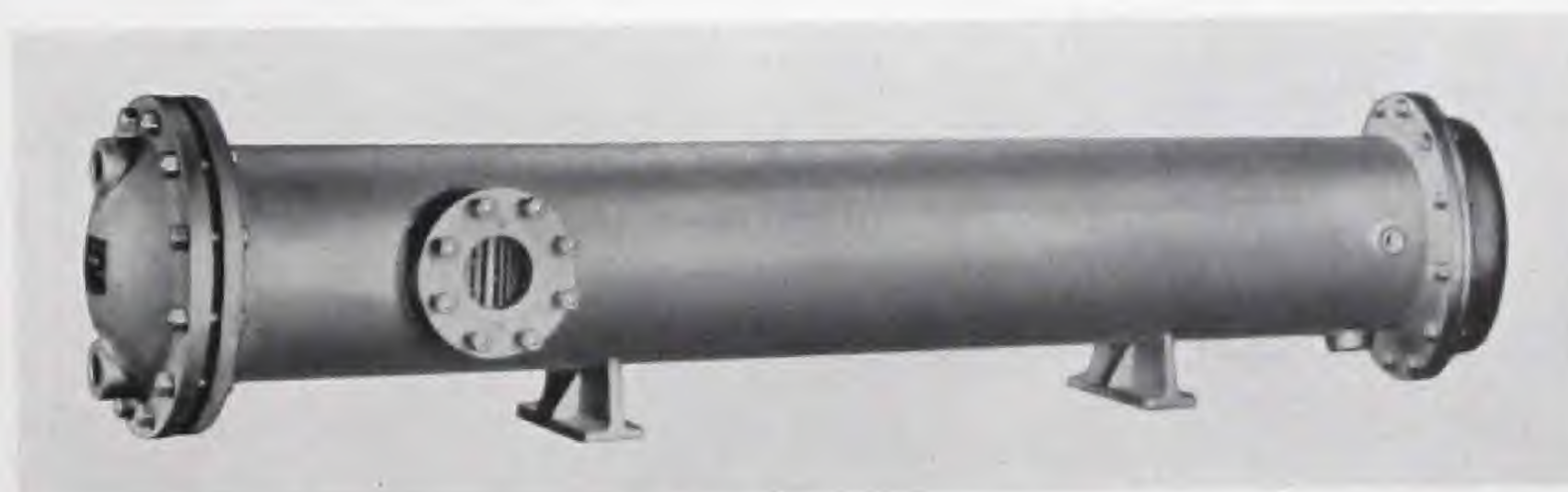
The method of heating only the liquid withdrawn effects a large saving in steam compared to the old practice of heating the entire volume in the tank.

Capacities and dimensions upon application.

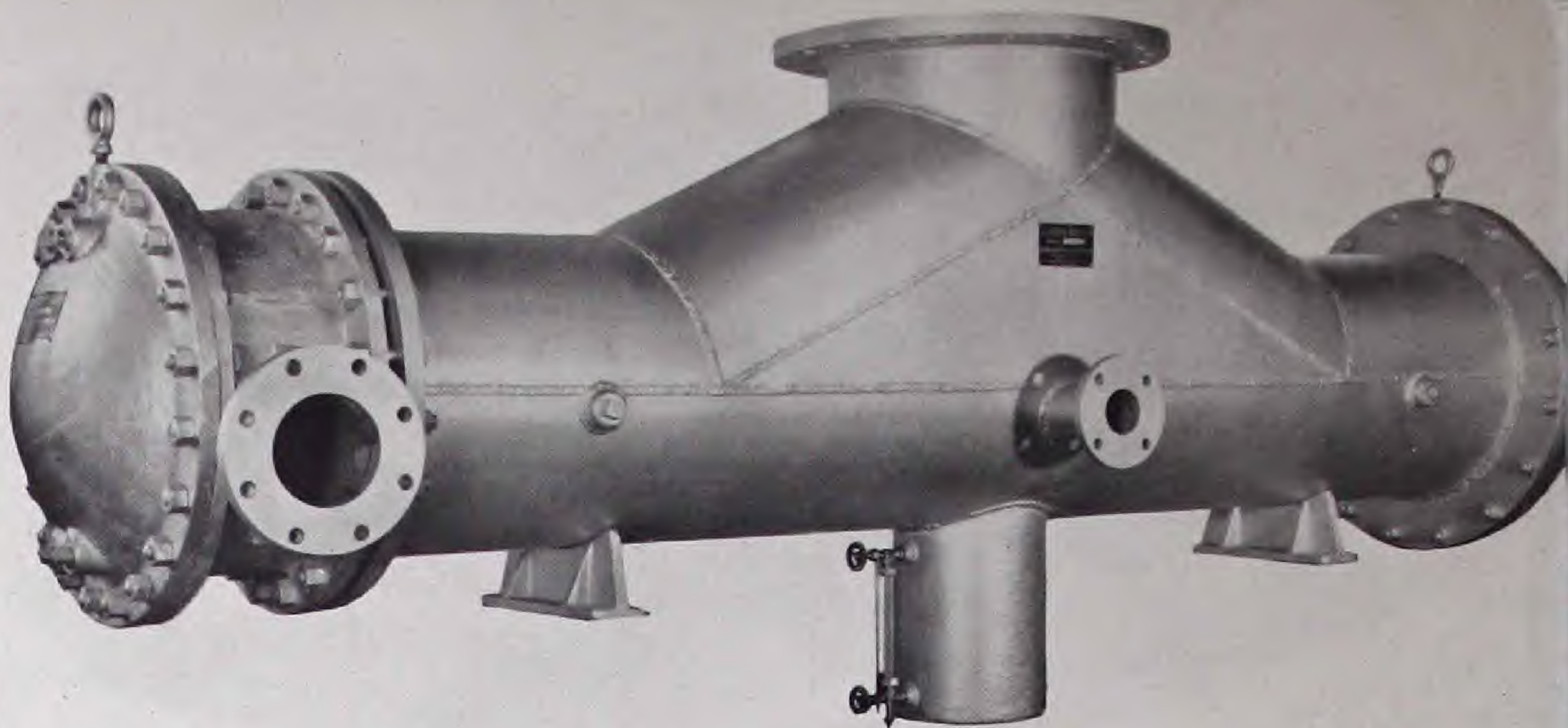


Alberger Fuel Oil Heater
U-Bend Type

Alberger Fuel Oil Heater
Floating Head Type

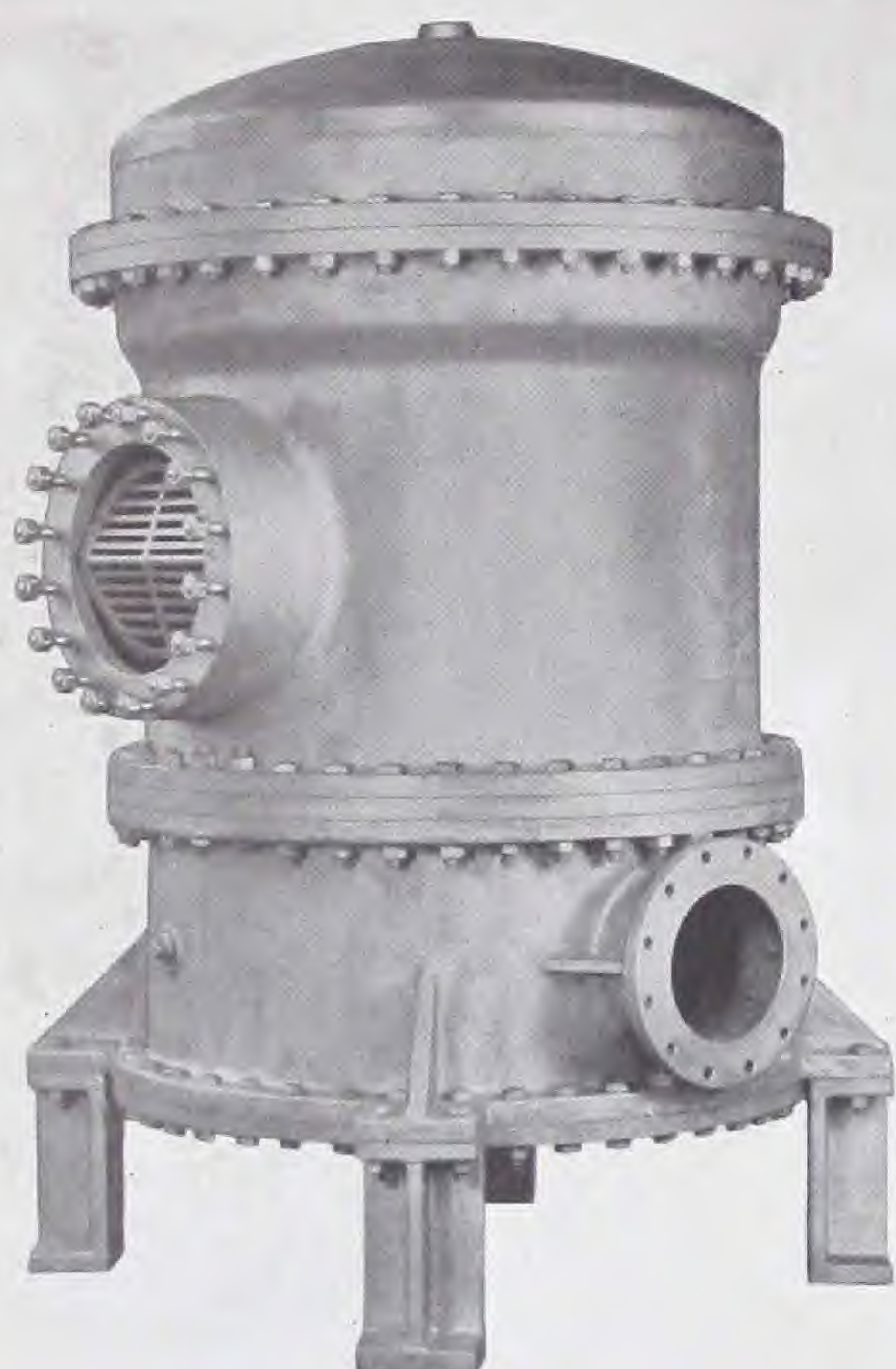


(Right)
High Vacuum Vapor
Condenser.

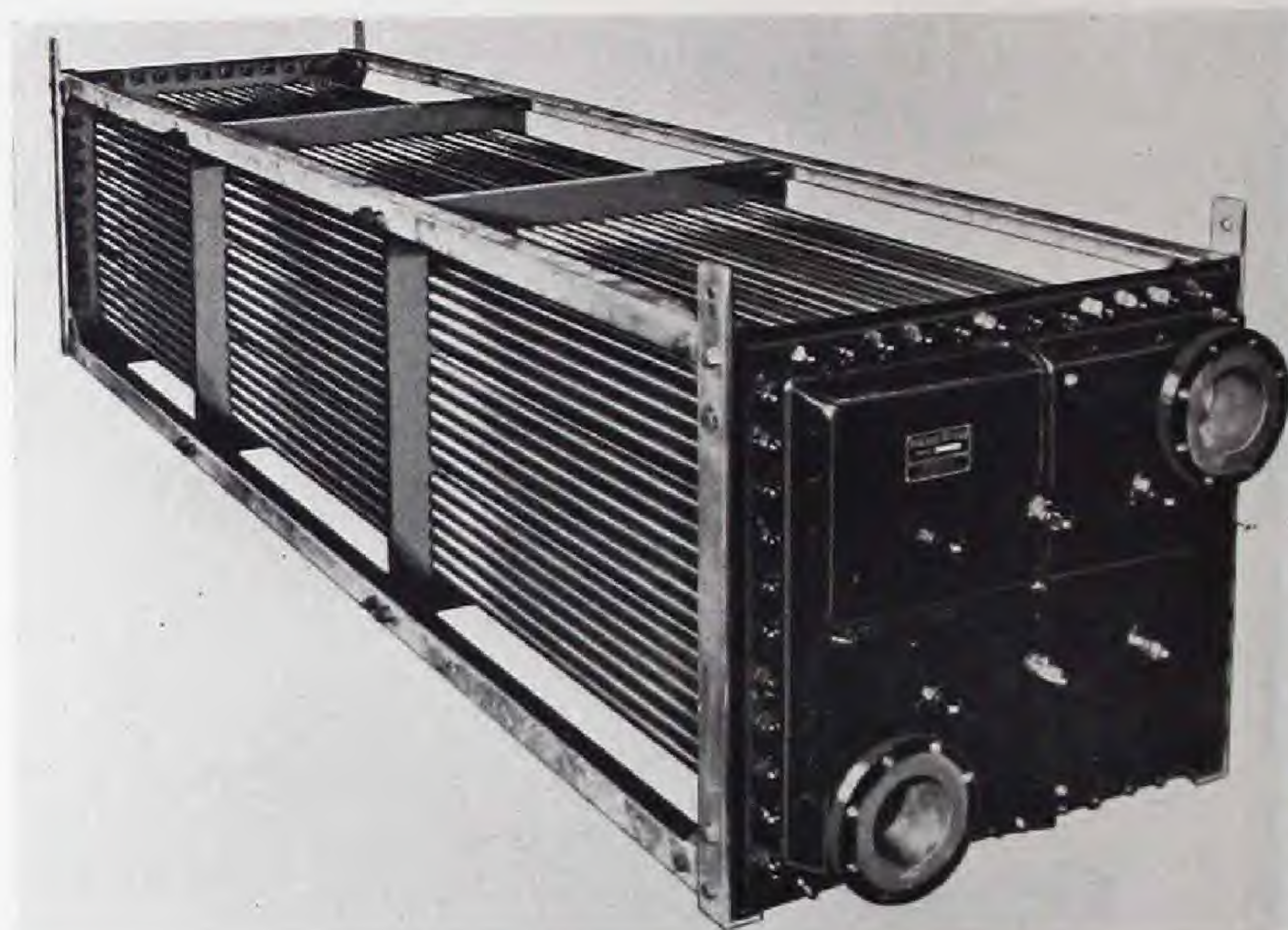


SPECIALLY DESIGNED EQUIPMENT

THE Alberger Heater Company specializes in the design and construction of heat interchange equipment for unusual conditions as found in the chemical, petroleum and allied industries.

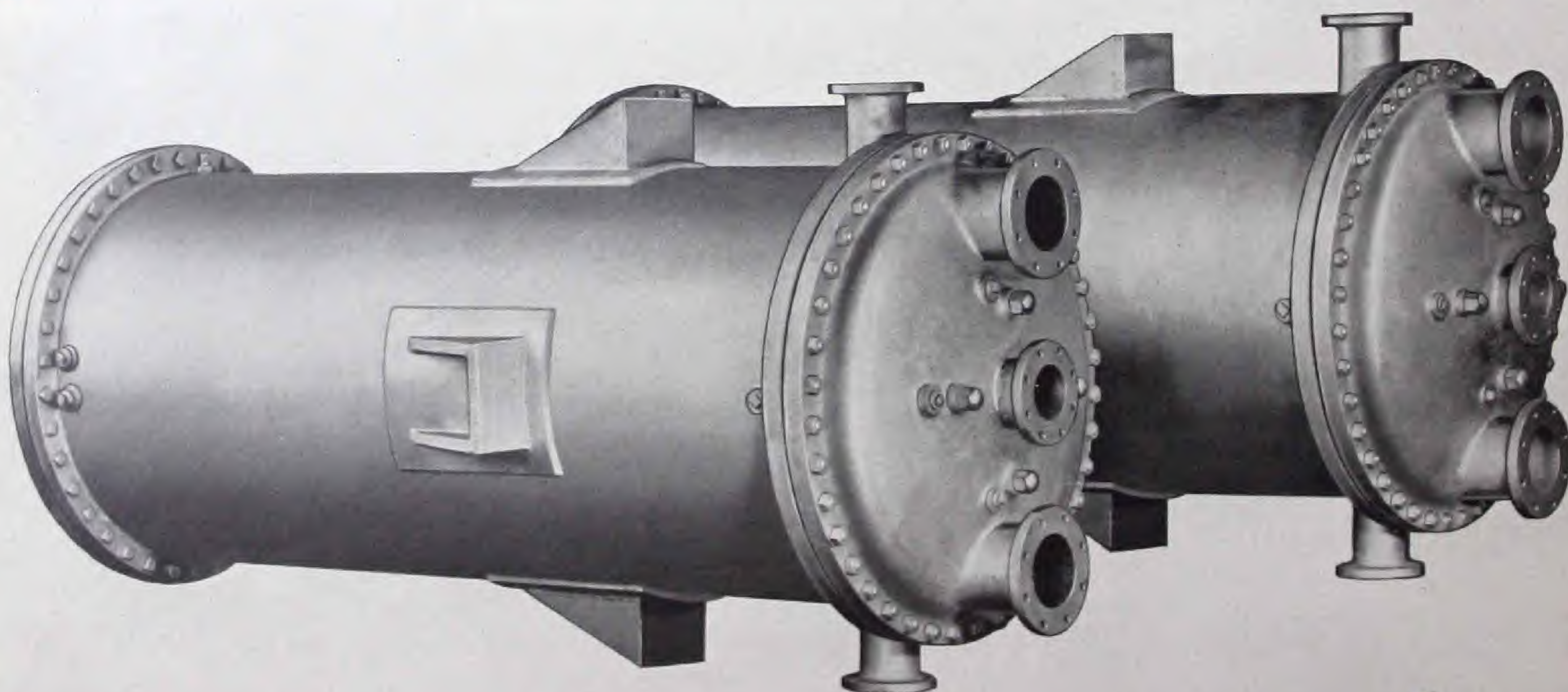


(Left)
Heating System Heater



(Right)
Laundry Pit Type
Waste Heat Reclaimer.

(Below) Sugar Liquor Coolers.



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ALBERGER HEATER COMPANY

281-289 CHICAGO STREET

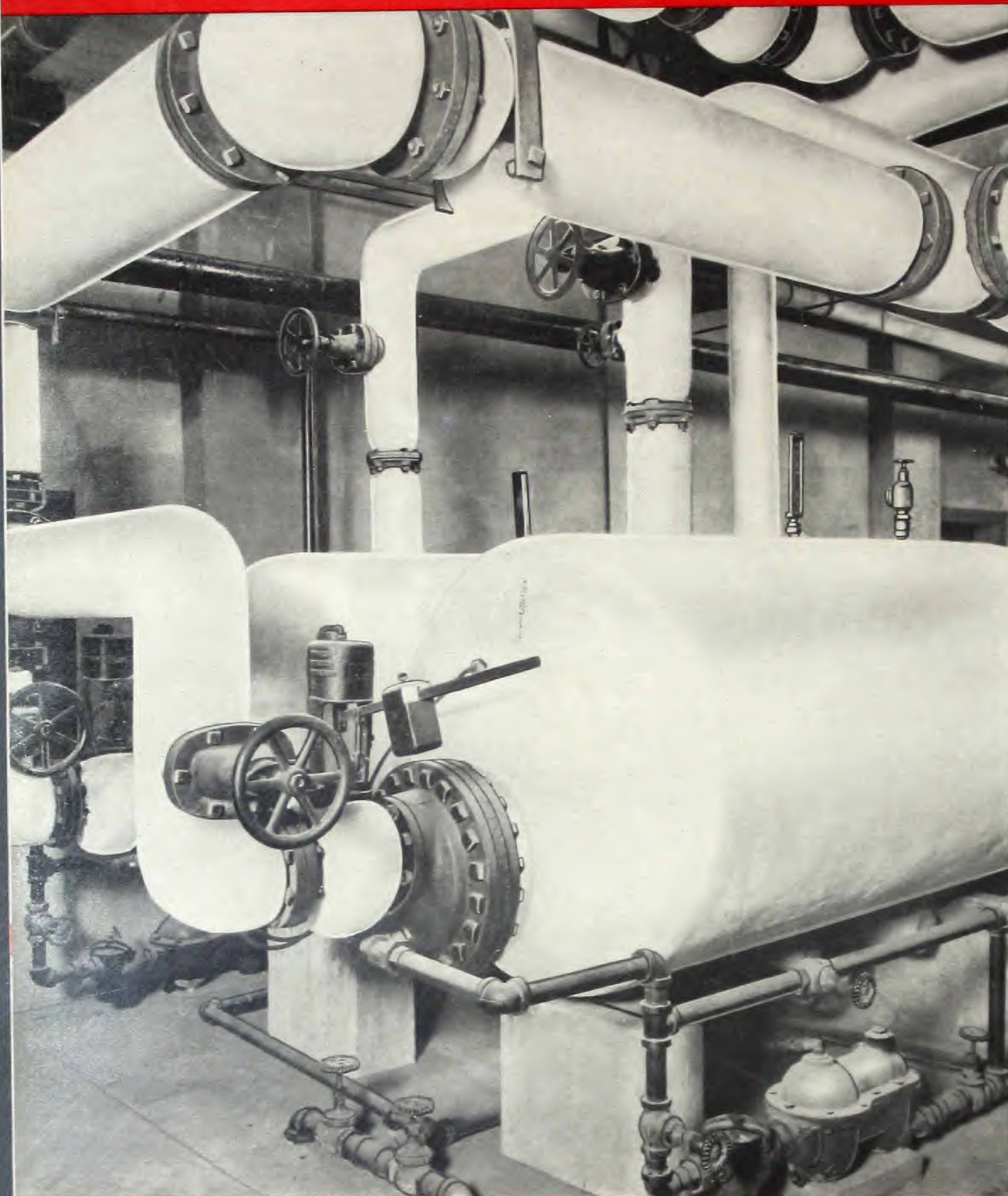
BUFFALO, N. Y.

We are affiliated with the Howard Iron Works, Buffalo, N. Y.,
Manufacturers of Slip Type Expansion Joints for pipe line service.

Representatives in all Principal Cities

Alberger **HEATERS**

EFFICIENT . . . DEPENDABLE . . . ACCESSIBLE



**INSTANTANEOUS
HEATERS**

**FEED WATER
HEATERS**

**STORAGE
HEATERS**

**HEAT
EXCHANGERS**

**VAPOR
CONDENSERS**

**SURFACE
CONDENSERS**

**HEATING SYSTEM
CONVERTERS**

**DOMESTIC WATER
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COOLERS



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